Interim Report of the National Type Evaluation Program (NTEP) Committee

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INTRODUCTION

The National Type Evaluation Program (NTEP) Committee (hereinafter referred to as "Committee") submits its Interim Report for consideration by the National Conference on Weights and Measures (NCWM). This report contains the items discussed and actions proposed by the Committee during its Interim Meeting in Santa Monica, CA, January 23-26, 2005.

Table A identifies the agenda items in the Report by Reference Key Number, Item Title, and Page Number. The item numbers are those assigned in the Interim Meeting Agenda. A voting item is indicated with a **"V"** after the item number.

An item marked with an **"I"** after the reference key number is an information item. An item marked with a **"D"** after the reference key number is a developing issue. The developing designation indicates an item has merit; however, the item was returned to the submitter for further development before any action can be taken at the national level. An item marked with a **"W"** was withdrawn by the Committee and generally will be referred to the regional weights and measures associations because it either needs additional development, analysis, and input or does not have sufficient Committee support to bring it before the NCWM.

This Report contains many recommendations to revise or amend National Conference on Weights and Measures (NCWM) Publication 14, Administrative Procedures, Technical Policy, Checklists, and Test Procedures or other documents. Proposed revisions to the publication(s) are shown in **bold face print** by **striking out** information to be deleted, and **underlining** information to be added. Requirements that are proposed to be nonretroactive are printed in ***italics.***

Note: The policy of NIST is to use metric units of measurement in all of its publications; however, recommendations received by the NCWM technical committees have been printed in this publication as they were submitted and may, therefore, contain references to inch-pound units.

Table A
Index to Reference Key Items

Table B
Appendices

*NTETC Sector Meeting Summaries are included in the CD version of the NCWM Publication 16 and will not be included in hard copies of the publication. Hard copies are available upon request from NIST Technical Advisors.

Details of All Items
(In Order by Reference Number)

1. I Test Data Exchange Agreements

Background/Discussion: This item was included on the Committee's agenda in 1998 to provide an update on NTEP's work to establish bilateral and multilateral agreements. Under such agreements and arrangements, manufacturers would be able to submit their equipment to any of the participating countries for testing to OIML-recommended requirements. The resulting test data would be accepted by other participants as a basis for issuing each country's own type approval certificate. Following is a report on the three types of test data exchange agreements.

Mutual Acceptance Arrangement (MAA): NTEP Director, Stephen Patoray, attended an MAA workshop, OIML Conference and CIML meeting in Berlin, Germany, in October 2004. Details on this item are contained within the NCWM Board of Directors' report as agenda item 10.

Bilateral Agreements: No additional discussions have been held on this topic. Additional discussions may be held pending the outcome of the MAA discussions.

NTEP-Canada Mutual Recognition Program: No additional discussions or meetings have been held on this subject. Future discussions may include Multiple Dimension Measuring Devices.

2. I Adoption of Uniform Regulation for National Type Evaluation by States

Background/Discussion: The Scale Manufacturers Association (SMA) has hosted NTEP adoption and implementation meetings for state directors at each regional weights and measures association conference. These meetings enable jurisdictions to share information about adopting and implementing NTEP in their respective jurisdictions, encourage non-NTEP jurisdictions to adopt the regulation, and allow current NTEP jurisdictions to share ideas on how to make enforcement more effective and uniform among the States. The meetings also provide NTEP management with information related to areas in which the operation and implementation of the program can be improved. Several questions have been posed at these meetings regarding issues associated with NTEP interpretation or practice. Comments from 1997 to 2004 have been summarized, without attribution, and are available for review and download on the SMA web site at http://www.scalemanufacturers.org.

SMA representative, Darrell Flocken, updated the NTEP Committee on the status of SMA's drive to assist States to adopt the Uniform Regulation for National Type Evaluation (URNTE) and the Uniform Regulation for the Voluntary Registration of Servicepersons and Service Agencies (VRSA). Mr. Flocken indicated the SMA decided it would be more useful to show which States require NTEP Certificates before allowing weighing and measuring devices to be certified as legal for trade regardless of their adoption of the NIST/NTEP URNTE. SMA developed a new map that shows that status. The SMA, deciding that it would be more useful to show which States require Registration of Service Agencies and Service Personnel regardless of their adoption of VRSA, developed separate maps that show that status. Such maps are available for review and download on the SMA web site at http://www.scalemanufacturers.org.

3. I NTEP Participating Laboratories and Evaluations Reports

At the 2005 NCWM Interim Meeting, Stephen Patoray, NTEP Director, updated the Committee on NTEP laboratory and administrative activities since October 1, 2004. A report from the NCWM Interim meeting 2005 is attached. See Appendix "A."

The next laboratory meeting is planned for April 2005 in Columbus, OH.

4. I NTETC Sectors Reports

The Committee received an update on the activities of the National Type Evaluation Technical Committee (NTETC) Sectors at the 2005 NCWM Interim Meeting. Outlined below is a brief summary of Sector activities since the 2004 NCWM Annual Meeting.

The NTEP Committee accepted recommendations from the Weighing Sector, the Measuring Sector, and the Grain Analyzer Sector.

There was additional discussion on editorial updates to the Taximeter section of NCWM Publication 14. These were reviewed and accepted by the NTEP Committee.

There was also discussion on the accepted section of NCWM Publication 14 Checklist for Cash Acceptors for weighing devices. After the sector recommended cash acceptor checklist language, a device incorporating cash acceptors was submitted for evaluation. During the evaluation, it became evident to the NTEP laboratory evaluator that some items in the recommended checklist were either vague or missing from the proposed Publication 14 language. The items identified by the laboratory were:

(1) insufficient paper to print a receipt and complete a transaction, and
(2) insufficient funds to return the correct change or return the correct amount inserted into the machine should a transaction be canceled.

The NIST Technical Advisor, Steve Cook, proposed some additional language. This language attempts to ensure that in case of an error the customer would receive information regarding the error in a printed receipt or be informed that they need to contact an attendant or store manager. The NTEP Committee agreed to add the additional language as "ad hoc" language in the 2005 update of NCWM Publication 14. The Committee discussed several additional “cash acceptor” issues that may require clarification or additional checklist requirements. An agenda item will be presented during the 2005 meeting of the Weighing Sector to address these issues. These items may also need to be addressed in other sections of NCWM Publication 14.

The NTEP Committee discussed an additional issue brought forward by a manufacturer regarding the title of Section 8.2 of NCWM Publication 14 Digital Electronic Scales, **Additional criteria for vehicle scales, railway track scales, combination vehicle/railway track scales, and other platform scales greater than 200 000 lb.** Information from the 1998 and 2000 Sector meetings was reviewed. The NTEP Committee instructed the NTEP Director to correct the Publication 14 language to reflect previous decisions of the sectors, identify the changes clearly in the Publication 14, and place this item on the agenda for the 2005 meeting of the Weighing Sector for additional comments and recommendations.

The NTEP Committee reviewed a request from the Grain Moisture Meter and Near Infrared Protein Analyzer Sectors to combine the two sectors and change the name to “Grain Analyzer Sector.” The Committee accepted these recommendations.

Grain Analyzer Sector: The NTETC Grain Moisture Meter and NIR Protein Analyzer Sectors held a joint meeting in Kansas City, MO on August 26-27, 2004.

The next meeting of the Grain Analyzer Sector is scheduled for August 24-25, 2005, in Kansas City, MO. For questions on the current status of Sector work or to propose items for a future meeting, please contact the Sector Technical Advisors:

Diane Lee
NIST WMD
100 Bureau Drive – Stop 2600
Gaithersburg, MD 20899-2600
Phone: 301-975-4405
Fax: 301-926-0647
e-mail: diane.lee@nist.gov

Jack Barber
J.B. Associates
10349 Old Indian Trail
Glenarm, IL 62536
Phone: 217-483-4232
e-mail: jbarber@motion.net

Measuring Sector: The NTETC Measuring Sector met October 21-22, 2004, in Gulfport, MS.

The next meeting of the Measuring Sector is scheduled for October 21-22, 2005, (tentative) in Memphis, TN conjunction with the Southern Weights and Measures Association's Annual Meeting. For questions on the current status of Sector work or to propose items for a future meeting, please contact the Sector Technical Advisor:

Richard Suiter
NIST WMD
100 Bureau Drive – Stop 2600
Gaithersburg, MD 20899-2600
Phone: 301-975-4406
Fax: 301-926-0647
e-mail: rsuiter@nist.gov

Weighing Sector: The NTETC Weighing Sector met August 29-31, 2004, in Ottawa, Canada.

The next Weighing Sector meeting is scheduled for September 25-27, 2005, in Columbus, OH. For questions on the current status of Sector work or to propose items for a future meeting, please contact the Sector Technical Advisor:

Steven Cook
NIST WMD
100 Bureau Drive – Stop 2600
Gaithersburg, MD 20899-2600
Phone: 301-975-4003
Fax: 301-926-0647
e-mail: stevenc@nist.gov

NTETC Sector Summaries: Past NTETC Sector summaries are available upon request from NCWM and the NIST Sector Technical Advisors:

NCWM Inc. or
Phone: 240-632-9454
email: ncwm@mgmtsol.com

NIST WMD Technical Advisor, Steve Cook
(See contact information above)

5. I NTEP Participation in U.S. National Work Group on Harmonization of NIST Handbook 44, NCWM Publication 14, and OIML R 76 and R 60.

Steve Cook of NIST reported that the Secretariat for OIML TC9/SC1 recently submitted the 1st Committee Draft (1CD) of OIML R 76-1 "Non-automatic Weighing Instruments" to the participating members of TC9/SC1 for review, comment, and vote. NIST is looking for input from the U.S. National Work Group on whether or not a meeting should be held in March 2005 to discuss the contents of the 1CD and help NIST develop a U.S. position and vote.

6. I Mix and Match Elements

There is no additional information on this item.

7. I Software Evaluation

General comments from the floor were supportive of developing this issue further.

The NTEP Committee discussed the pros and cons of software evaluation. General concerns relate to difficulties identifying software and determining traceability to an NTEP Certificate of Conformance during field verification and providing NTEP laboratories with a meaningful and functional checklist for evaluating software security and functions.

NCWM staff will gather the costs involved with forming a Sector and the costs to conduct a Sector meeting. This information, along with a detailed action plan for the development of the sector charges, will be presented and reviewed by the NCWM Board of Directors at its next regularly scheduled meeting in March 2005.

G. Weston Diggs, Virginia, NCWM Chair
Don Onwiler, Nebraska, NCWM Chairman-Elect
Stephen Pahl, Texas
Charles Carroll, Massachusetts

NTEP Technical Advisor: S. Patoray, NTEP Director
NTEP Technical Advisor: S. Cook, NIST WMD

National Type Evaluation Program Committee

Appendix A

NTEP Participating Laboratories and Evaluation Reports

	Previous Quarter 10/1/03-1/4/04	Current Quarter 10/1/04-1/4/05	Total to Date 10/1/00-1/4/2005
Total Applications Processed	58	61	1027
Applications Completed	48	4	782
New Certificates Issued:	51	29	975
Certificates Distributed to State Directors	57	40	961
Certificates Posted to Web Site	65	51	3509
Active NTEP Certificates:			1508

	Average	Median
Time for NCWM to assign an evaluation:	12 days	8 days
Time for NCWM to review a draft CC:	6 days	6 days
Time for complete evaluation:	158 days	109 days

Appendix B

National Type Evaluation Technical Committee (NTETC)
Grain Moisture Meter (GMM) and NIR Sector Annual Meetings

August 26-27, 2004 - Kansas City, Missouri
Draft Summary of Decisions

Agenda Items

Note: Because of common interest, agenda items 8 through 12, above, were considered in a joint session of the NIR Grain Analyzer and the Grain Moisture Meter Sectors

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1. Report on GIPSA/NIST Interagency Agreement Renewal

Background: The current five-year Interagency Agreement between GIPSA and NIST that provides funding for the Grain Moisture Meter On-going Calibration Program (OCP) expires at the end of the Federal Government's Fiscal Year (FY) 2004 (September 30, 2004). Under the terms of the present agreement NIST and GIPSA each contribute one-third the cost of the program subject to an annual maximum of $18,000 each. The balance of costs is borne by manufacturers and depends on the number of meter models in the NTEP "pool" according to a fee schedule. The fee schedule has remained fixed since October 1, 1999. NIST and GIPSA have reviewed costs associated with the program and a revised fee schedule has been proposed. At the Sector's 2003 meeting Dr. Richard Pierce, GIPSA, briefed the Sector on the proposed fee schedule, a draft of which is shown below. Implementation of the proposed fee schedule, which would become effective at the start of FY 2005 (October 1, 2004), is subject to approval by both agencies. Dr. Pierce reported that the fee schedule in the proposed agreement has been the subject of serious discussion at GIPSA. GIPSA has had to increase its hourly fees for services by 50 % to 100 % over the rates used when the proposed fee schedule was calculated. However, at the time of the Sector meeting, it appeared likely that GIPSA would agree to absorb the added costs at least for the coming year. Costs will be reviewed at the end of each year and manufacturers are likely to see a fee increase in subsequent years even if the number of meters remained constant. A copy of the proposed agreement has been forwarded for signing, but as of September 11, 2004, no signatures were in place.

Proposed NTEP On-Going Calibration Program Fee Schedule For Fiscal Year 2005 to 2009							
(1) Total Meters (including official meter)	(2) Meters in NTEP Pool	(3) Cost per NTEP Pool Meter	(4) Total Program Cost	Funding Contribution from Participants			
				(5) NIST	(6) GIPSA	(7) Manufacturers (total funding from mfg's)	(8) Cost per Meter Type
2	1	19,875	19,875	6,625	6,625	6,625	3,315
3	2	19,875	39,750	13,250	13,250	13,250	4,415
4	3	19,875	59,625	19,875	19,875	19,875	4,970
5	4	19,875	79,500	26,500	26,500	26,500	5,300
6	5	19,875	99,375	26,500	26,500	46,375	7,730
7	6	19,875	119,250	26,500	26,500	66,250	9,465
8	7	19,875	139,125	26,500	26,500	86,125	10,765
9	8	19,875	159,000	26,500	26,500	106,000	11,775

2. Report on OCP (Phase II) Testing

Phase II Ongoing Calibration Program (OCP) data for the 2003 crop year was in manufacturers' hands by February 1, 2004. Cathy Brenner of the Grain Inspection, Processors and Stockyards Administration (GIPSA, formerly FGIS), the NTEP Participating Laboratory for Grain Moisture Meters, reported that billing for the 2004 cycle was sent out in June 2004 based on the Interagency Agreement currently in place. Five models will be enrolled in Phase II for the 2004 harvest.

DICKEY-john	GAC2100
Foss	Infratec 1229, Infratec 1241
Seedburo	1200A
Steinlite	SL95

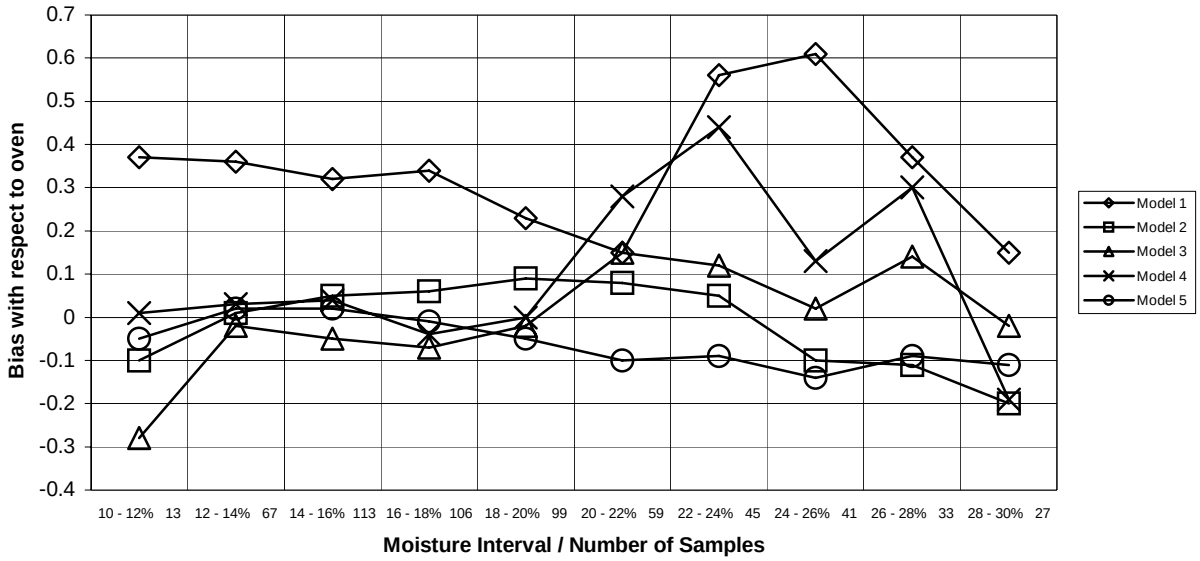
3. Publication 14 – GMM Tolerances for Calibration Performance

Background: To address concerns that different meter types were not as closely aligned with the air oven as they could be, the Sector, at their August 2003 meeting, recommended a change to Publication 14 that would require a calibration to meet Phase I tolerances (without the application of a confidence interval) for each 2 % interval of the basic 6 % moisture range in order for that calibration to remain on the Certificate of Conformance.

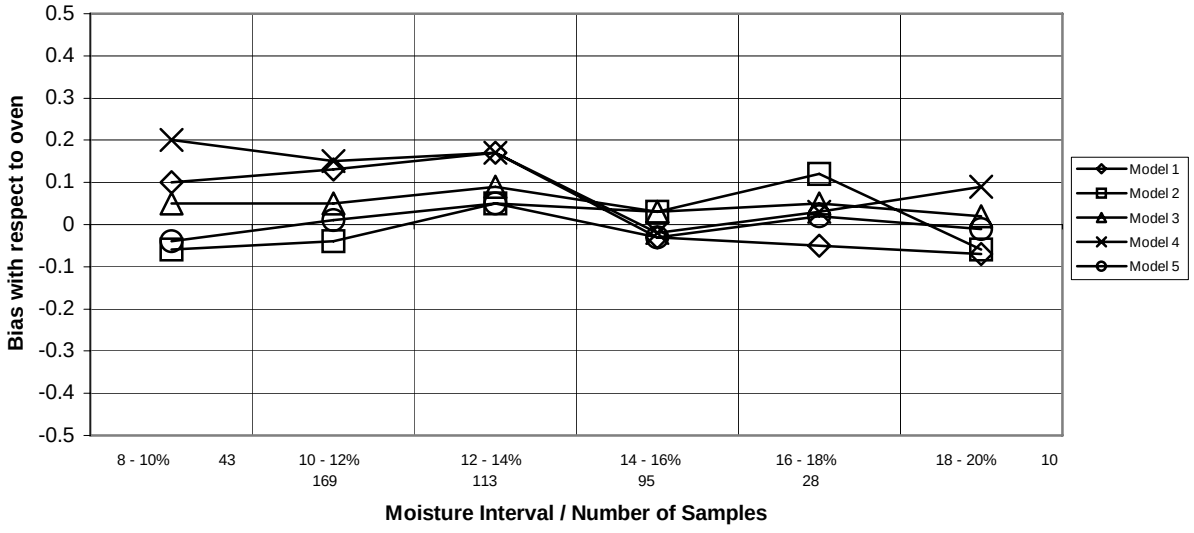
During the discussion on this issue, Dr. Charles Hurburgh, Jr., Iowa State University, pointed out that if there is a statistically significant bias between two meters and both meet “Approved” tolerances, then the tolerance is too broad. It was suggested that statistics are needed to show that meters as a cluster are aligned with each other in addition to aligning with the air oven. A subcommittee was formed to look at approval tolerances and uniformity among meters. When the subcommittee met, it became clear that a major obstacle to further study this matter by the committee would be greatly hindered by the fact that manufacturers consider Ongoing Calibration Program (OCP) data proprietary, and the NTEP Laboratory is not free to release this data. Dr. Richard Pierce, GIPSA (the NTEP Laboratory), offered to look further into the matter and have GIPSA's statistician prepare a report.

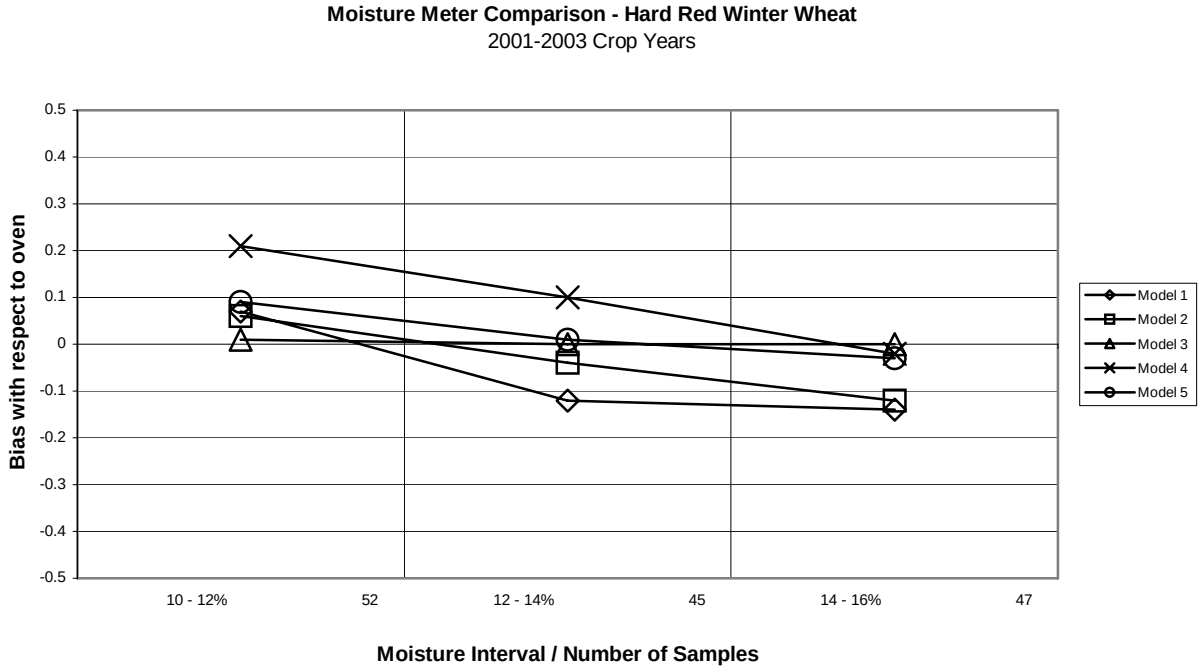
Discussion: Dr. Pierce presented data showing the performance of NTEP meters compared to the air oven. These data were based on the last three crop years (2001 – 2003) using calibrations updated for use during the 2004 harvest season. Dr. Pierce reported that the data for the most recent three-year period is similar to data presented to the Sector five years ago. Addressing the results for corn, Dr. Pierce conceded that alignment (between meters) could be improved. With the exception of one model, agreement between meters was good over the basic 6 % moisture range. Dr. Hurburgh pointed out that each point on the graphs represents an average of a significant number of samples; thus, there is an implied "error bar" for each point. As a result, on individual samples there could be a wide dispersion in measurements between two different meter models. The results for corn, soybeans, and hard red winter wheat are shown graphically below.

Moisture Meter Comparison - Corn
2001-2003 Crop Years



Moisture Meter Comparison - Soybeans
2001-2003 Crop Years





Dr. Pierce explained that wet corn is a problem. Above 20 % moisture, the number of available samples drops significantly with each 2 % interval of increasing moisture. In addition, year-to-year variability can be significant. In response to a suggestion that a tighter tolerance be applied to a three-year rolling average of the bias for each 2 % interval above 20 % moisture, Dr. Pierce replied that the problem lies in the imperfect sample set for moistures above 20 % moisture where meters show the most year-to-year variability. There are a limited number of samples, and the samples are not fully representative of the population. As a result, even three-year rolling averages may vary from year to year for each 2 % interval above 20 % moisture. This is the reason that Publication 14 applies confidence intervals to the tolerances for each 2 % interval above the basic 6 % moisture range.

Calling attention to the substantial difference between Models 1 and 5 on corn, Rich Flaugh, GSF, Inc., urged the Sector to work harder on this issue, noting that GSF had performed studies showing that the discrepancies above 20 % moisture (on corn) have been present for a number of years. He also pointed out that 2 to 4 million bushels of corn run through one meter (with a + 0.6 % bias) could cost producers $250,000 in excess shrink and drying charges.

It was suggested that the alignment problem could be solved if comparative data identifying each model by manufacturer were to be published. (Such data is presently considered proprietary according to the terms of the interagency agreement.) An informal poll of manufacturers indicated they were generally opposed to publishing this data or including a chart or graph of biases for their individual meters on the Certificate of Conformance. There was concern that this data might be misinterpreted and might lead to unnecessary calibration changes. Dr. Pierce cautioned that tolerances should not be so tight as to require calibration changes every year. Calibration changes to the official meter are upsetting to the grain trade as they can have a substantial effect on the value of grain inventories.

As presently written, there is nothing in the Grain Moisture Meter chapter of Publication 14 to force a calibration change for a meter exhibiting bias characteristics similar to those shown for meter Model 1 on corn moisture. Dr. Pierce suggested the Sector might want to consider an "overall bias" requirement similar to GIPSA's "Rule for sustained biases" cited below, but with a 0.20 limit on overall bias:

A calibration is considered for bias correction when all of the following conditions are met:

(1) The three-year average calibration bias (the three-year average bias over the entire range) exceeds 0.15 % moisture,
(2) The most recent three-year average calibration bias exceeds twice the standard deviation of past three-year average calibration biases.

One Sector member originally opposed an "overall bias" rule, believing this would not improve performance of meters in the field. This opposition was withdrawn when it was explained that: 1) moisture meter calibrations are always based on historical data; 2) although based on raw data collected over a three-year period, a calibration having a smaller bias with respect to air oven on that data has a greater probability of exhibiting a smaller bias on next year's crop; and 3) assuming that meters of like type in the field are aligned with the NTEP laboratory meter, the bias of meters in the field will also be reduced. Another member originally opposed an "overall bias" rule on the grounds that it was trying to hit a moving target. This objection was also withdrawn after considering that any proposed rule would incorporate a bias tolerance wider than the 0.15 % moisture used by GIPSA. The Sector then agreed to consider a written proposal to add an "overall bias" rule to Publication 14.

During discussion of proposed wording, questions were raised about handling new meters where less than three years of data was available. It was recognized that calibrations for a new meter might have to change each year until enough data could be accumulated. One Sector member recalled that this, in fact, did happen for some meters in the first few years of the OCP. The Sector agreed that an "overall bias" rule should apply to all available OCP data for the most recent three-year period. If only one year of data is available, the rule will apply to that year's data. The requirement that the most recent three-year average calibration bias exceed twice the standard deviation of past three-year average calibration biases was dropped for two reasons: 1) at least four years of data are required before this requirement can be evaluated, and 2) an overall average calibration bias limit of 0.20 would catch the worst offenders and would not cause unnecessary calibration changes.

Conclusion and Recommendation: The Sector agreed to recommend the addition of an overall calibration bias requirement based on up to three years of available Ongoing Calibration Program data collected by the NTEP Laboratory to § **IV. Tolerances for Calibration Performance** of the Grain Moisture Meter Chapter of the 2004 edition of Publication 14 as shown below:

IV. Tolerances for Calibration Performance

Calibration performance must be tested against established criteria at the following stages of the type evaluation process:

1. Evaluation of the calibration data supplied by the manufacturer with the application for type evaluation.

2. Evaluating instrument and calibration performance over the 6 % moisture range for corn, HRW wheat and soybeans (accuracy test discussed earlier).

3. Initial calibration approval for grains other than corn, HRW wheat, and soybeans.

4. Review of ongoing calibration data collected as part of the national calibration program.

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New calibrations will be approved based upon the re-predicted moisture values. Approval tolerances will be one-half of the Handbook 44 acceptance tolerance and will be applied in 2 % intervals over the range of available data. Additionally, for up to three years of available data:

a. The difference between the average bias to air oven for all samples in a given year and the average bias to air oven for any other year shall not exceed: 0.90 for corn; 0.80 for rice, oats, sunflowers and sorghum; and 0.70 for wheat, soybeans, and barley.

b. The range of year-to-year differences in bias to air oven shall not exceed the H-44 tolerances for three or more consecutive 2 % moisture intervals. Only moisture intervals consisting of five or more samples per year will be considered for this comparison.

c. The average calibration bias with respect to air oven shall not exceed 0.20 % moisture, calculated using the most recent calibration and all available raw data collected within the last 3 years for the entire moisture range.

Failure to meet the requirements in either item a, b, or c above will cause a "No Longer Approved for Use" status to be assigned to the affected grain type(s) on the NTEP Certificate of Conformance (CC) for that instrument. Calibration coefficients will not be listed for any calibration failing these requirements.

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4. Proposed Change to Publication 14 – Test Weight per Bushel Range for Test Weight Accuracy, Precision and Reproducibility Tests

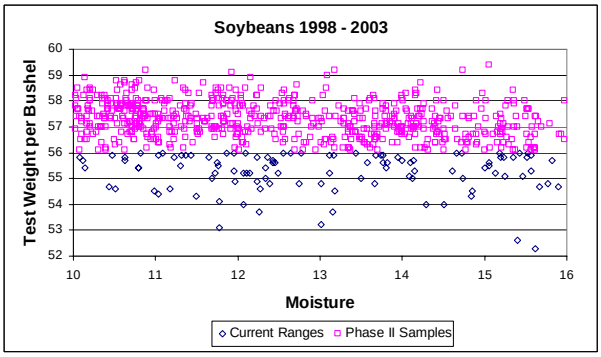
Background/Discussion: Publication 14 stipulates that samples used for Test Weight per Bushel (TW) type approval tests for accuracy, precision, and reproducibility are to be selected to meet the following conditions:

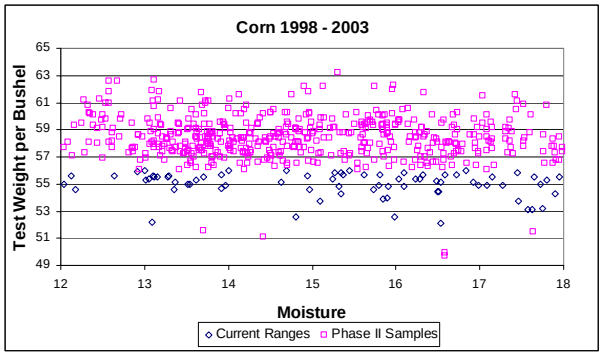
a) A total of 12 samples are required per grain type
b) Samples should be selected from the same 6 % moisture range used for GMM Phase I tests;
c) No less than 8 samples should come from the lowest two-thirds of the 6 % moisture range;
d) No less than 2 samples should come from the highest one-third of the 6 % moisture range;
e) The range of sample TWs should be no less than the range that is grade determining; and
f) Samples should represent a distribution of Test Weights per Bushel (TW) that minimizes the correlation between TW and moisture.

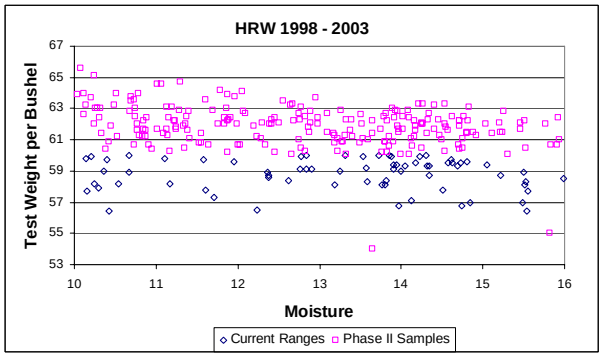
The specific requirements for the test samples are spelled out for each grain type in a table in § VII. B. of the 2004 Edition of the Grain Moisture Meters chapter of Publication 14.

In an attempt to assemble a set of test samples, the NTEP Laboratory screened a group of samples from the 1998 – 2003 Phase II moisture survey supplemented by additional samples collected from GIPSA field offices to eliminate those not within the specified 6 % moisture range. From the remaining samples, attempts were made to meet the distribution requirements by first selecting those with TWs close to the low end of the specified TW range in each 2 % moisture interval. There were problems locating samples of sufficient volume (the quart kettle reference method for TW requires "enough grain to overflow the kettle) within the specified moisture range, test weight range, and correlation requirements. The following table shows the current Publication 14 TW ranges, the percentage of Phase II samples in those ranges, and the actual TW range of the sets the Lab was able to use for evaluation purposes.

Type of Grain	Moisture Range	Publication 14 Min Test Weight per Bushel Range	% Useable Within Current TW Range	Range used for Sets
Corn	12 - 18 %	52 - 56	8	52.6 - 57.3
Soybeans	10 - 16 %	52 - 56	11	51.5 - 56.9
Hard Red Winter Wheat	10 - 16 %	56 - 60	17	57.2 - 61.4
Durum Wheat	10 - 16 %	56 - 60	21	57.3 - 61.9
Soft White Wheat	10 - 16 %	56 - 60	22	57.1 - 62.1
Hard Red Spring Wheat	10 - 16 %	55 - 58	6	55.2 - 59.5
Soft Red Winter Wheat	10 - 16 %	56 - 60	37	55.6 - 60.1
Hard White Wheat	8 - 14 %	56 - 60	4	56.6 - 63.6
Two-Row Barley	10 - 16 %	43 - 47	4	45.8 - 52.6
Six-Row Barley	10 - 16 %	43 - 47	31	43.5 - 48.6
Oats	10 - 16 %	30 - 36	31	31.4 - 38.2
Sunflower Seed	6 - 12 %	24 - 27	3	26.5 - 31.3
Long Grain Rough Rice	10 - 16 %	42 - 46	50	42.0 - 46.7
Medium Grain Rough Rice	10 - 16 %	44 - 48	56	44.2 - 48.6
Grain Sorghum	10 - 16 %	53 - 57	4	56.0 - 60.9







The difficulty in locating samples of sufficient size for the quart kettle reference test weight measurement within the moisture range, test weight range, and correlation requirement can be seen by examining graphs of TW vs. moisture for Phase II samples from the six most recent crop years (1998 – 2003) for corn, soybeans, and hard red winter wheat. It is even more difficult to locate qualified samples for some of the less widely traded grains. Samples represented by diamonds on the graphs are samples that meet the current selection criteria.

By changing the TW Range required for the test sample sets, many more samples could be made available for selection. The following chart shows the grade-determining minimum TWs for grades 1, 2, and 3 (or in parenthesis the current Publication 14 range if different); the proposed TW range (which in most cases includes the minimum TWs for grades 1 and 2); and the percentage of 1998-2003 Phase II samples that would be available for selection with the proposed TW range compared to the percentage available with the current range.

Grain Type	Minimum TW for Grade (pounds/bushel)			Proposed Range	Percent Available with Proposed Range	Percent Available with Current Range
	Grade 3	Grade 2	Grade 1	---	---	---
Corn	52	54	56	54 - 58	26	8
Soybeans	52	54	56	55 - 59	73	11
Hard Red Winter Wheat	56	58	60	59 - 63	54	17
Durum Wheat	56	58	60	59 - 63	50	21
Soft White Wheat	56	58	60	58 - 62	50	22
Hard Red Spring Wheat	55	57	58	58 - 61	37	6
Soft Red Winter Wheat	56	58	60	56 - 60	37	37
Hard White Wheat	56	58	60	60 - 64	28	4
Two-Row Malting Barley (43-47)	48	48	50	47 - 51	32	4
Six-Row Barley	43	45	47	43 - 47	31	31
Oats	30	33	36	33 - 39	47	31
Sunflower Seed (24-27)		25	25	28 - 31	32	3
Long Grain Rough Rice	(42-46)			43 - 47	60	50
Medium Grain Rough Rice	(44-48)			44 - 48	56	56
Grain Sorghum	53	55	57	58 - 62	56	54

One Sector member expressed concern that meters won't be evaluated in the range where (for corn) discounts are most likely to be applied. The user presumes that the meter has been evaluated over the entire operating range, when, in fact, it will have been evaluated only at the upper range of operation. Dr. Hurburgh, explained that the main use of test weight (for corn) is in certifying warehouse volume. Test weight (TW) is not widely discounted for corn. Low TW for corn is a rare occurrence, which is why low TW corn samples are difficult to obtain. Furthermore, in contrast to moisture, the measurement of TW is inherently linear. There is not a problem extrapolating to lower TWs.

The Sector agreed to the following recommendation.

Recommendation: Change the Minimum Test Weight per Bushel Range in the Table in §VII.B. of the 2004 Edition of the Grain Moisture Meters chapter of Publication 14 on the following page:

Type of Grain	Moisture Range	Minimum Test Weight per Bushel Range	Criteria for Sample Selection
Corn	12 - 18 %	54 - 58	a). No less than 8 samples should come from the lowest two-thirds of the 6 % moisture range. b). No less than 2 samples should come from the highest one-third of the 6 % moisture range. c). Samples should represent a distribution of Test Weights per Bushel (TW) that minimizes the correlation between TW and moisture.
Soybeans	10 - 16 %	55 - 59	
Hard Red Winter Wheat	10 - 16 %	59 - 63	
Durum Wheat	10 - 16 %	59 - 63	
Soft White Wheat (except White Club)	10 - 16 %	58 - 62	
Hard Red Spring Wheat (and White Club)	10 - 16 %	58 - 61	
Soft Red Winter Wheat	10 - 16 %	56 - 60	
Hard White Wheat	8 - 14 %	60 - 64	
Two-Row Barley	10 - 16 %	47 - 51	
Six-Row Barley	10 - 16 %	43 - 47	
Oats	10 - 16 %	33 - 39	
Sunflower Seed (Oil Type)	6 - 12 %	28 - 31	
Long Grain Rough Rice	10 - 16 %	43 - 47	
Medium Grain Rough Rice	10 - 16 %	44 - 48	
Grain Sorghum or Milo	10 - 16 %	58 - 62	

5. Proposed Change to Publication 14 – Repeatability Tolerances for Test Weight

Discussion: The tolerance for the Test Weight per Bushel repeatability test of Publication 14 is marginally too tight for corn and for oats. The present limit is 0.4 times the absolute value of the Handbook 44 acceptance tolerance of 0.8 pounds per bushel for corn and oats. At the time the Sector recommended a multiplier of 0.4 for repeatability, which translates to a tolerance of 0.32 pounds per bushel, it was a "best estimate" value with little data available to show if this limit would be marginal with the sample test set specified in Publication 14. Subsequent testing indicates that 0.40 pounds per bushel is a more realistic repeatability tolerance for corn and oats.

Certificates of Conformance have been issued for the 2004 crop year. One device met the present repeatability tolerance for corn (admittedly by a very small margin). No devices have met the present repeatability tolerance for oats.

The Sector agreed by consensus to recommend the following change in repeatability tolerances for Test Weight in Publication 14.

Recommendation: Change tolerances for repeatability for corn and oats in § VII. B. of the Grain Moisture Meter chapter of the 2004 edition of Publication 14 as follows:

> Tolerances for repeatability for all grain types except corn and oats are 0.4 x the absolute value of the Handbook 44 acceptance tolerance. The tolerance for repeatability for corn and oats is 0.5 x the absolute value of the Handbook 44 acceptance tolerance. Specific tolerances are:

Grain Type	Tolerance
Corn, oats	0.40 pounds per bushel
All wheat classes	0.20 pounds per bushel
Soybeans, barley, rice, sunflower, sorghum	0.28 pounds per bushel

6. Handbook 44, § 5.56(a) Paragraph S.2.6. Determination of Quantity and Temperature

Background: In August 2002 the Sector considered whether their recommended changes to NIST Handbook 44, § 5.56(a), paragraph S.2.6., relating to a means of sensing adequate sample volume, should be retroactive or nonretroactive. Discussion centered on the requirement that meters measuring TW must provide some means to ensure that measurements of TW are not allowed to be displayed or printed when insufficient sample volume has been supplied. (Although the code does not specify how this is to be accomplished, it is generally assumed that the means will include a sensor of some sort installed in either the sample hopper or the test cell.)

Those favoring making the proposed code retroactive reminded the Sector that although moisture measurements are not significantly affected when samples are not of sufficient size to completely fill the measuring cell of a GMM, the TW measurement is greatly affected when the cell is not filled. Measurement of TW requires determination of two parameters: volume and mass. The vast majority of GMM's with TW capability presently in the field do not have means to assure that the measuring cell is completely full. If the cell is not filled completely, TW indications will be lower than they should be to the disadvantage of the producer selling grain. Some sector members favoring making the code nonretroactive felt that GMM's with a window, through which the test cell could be seen, provided adequate means to verify that the cell had been filled. A grain industry member expressed the belief that compared to how test weight measurements are being made now, the worry about a sensor was trivial. As long as the GMM could produce an accurate TW measurement when properly used, whether or not the hopper had a sensor, was not important. Some thought this was a facilitation of fraud issue and favored making the sensor requirement retroactive. Others thought that making the code retroactive would unfairly penalize users of existing NTEP meters with TW capability. By a vote of 9 to 4, the Sector agreed that the addition to paragraph S.2.6. relating to a means of sensing adequate sample volume should be nonretroactive. As adopted by the Conference, this paragraph currently reads:

> **S.2.6. Determination of Quantity and Temperature. -** The moisture meter system shall not require the operator to judge the precise volume or weight and temperature needed to make an accurate moisture determination. External grinding, weighing, and temperature measurement operations are not permitted. In addition, if the meter is capable of measuring test weight per bushel, determination of sample volume and weight for this measurement shall be fully automatic *and means shall be provided to ensure that measurements of test weight per bushel are not allowed to be displayed or printed when an insufficient sample volume is available to provide an accurate measurement.*
> (Added 1994)(Amended 1995 and 2003)
> *[Nonretroactive as of January 1, 2004]*

Discussion: Handbook 44, §1.10. General Code, Paragraph G-A.6. states:

> **Nonretroactive Requirements.** "Nonretroactive" requirements are enforceable after the effective date for:
>
> (a) devices manufactured within a State after the effective date;
> (b) both new and used devices brought into a State after the effective date; and
> (c) devices used in noncommercial applications which are placed into commercial use after the effective date.
>
> Nonretroactive requirements are not enforceable with respect to devices that are in commercial service in the State as of the effective date or to new equipment in the stock of a manufacturer or a dealer in the State as of the effective date.
> *(Nonretroactive requirements are printed in italic type*)]
> (Amended 1989)

Thus, as Handbook 44 is currently written, a State can test the TW feature of any GMM placed into commercial service in that State prior to January 1, 2004, and approve or reject it, whether or not the device has the means to ensure that sufficient volume is available for an accurate test. However, some States have indicated they will not allow the use of a TW feature unless an active Certificate of Conformance (CC) covers the TW feature of the device. NCWM, Inc., is accepting applications for NTEP testing for TW capability for only those GMMs incorporating a volume sensor.

During development of the Handbook 44 Code relating to TW, several Sector members made a strong case for requiring that GMMs with TW capability be able to prevent a TW indication and printout if insufficient volume of grain is present for an accurate reading.

The Sector considered the following questions:

- How are states enforcing this requirement?
- Are meters without a volume sensor being tested for TW?
- If a volume sensor is important for accurate TW measurement, should this requirement be retroactive (perhaps with a future effective date) or should it remain nonretroactive?

Diane Lee, NIST WMD, reported that based on the calls she had received from State W&M personnel, the states were not enforcing this portion of the code uniformly. One State W&M representative reported that to date they have not been approving meters for TW if they did not have volume sensors. For survey purposes, they had tested a group of meters not having volume sensors. A large portion of that group did not pass the tests for TW. It was suggested that these failures were most likely due to poor maintenance rather than inadequate volume of sample. Although a W&M representative was not present from Illinois, it was reported that Illinois was conducting TW tests on all meters in place before January 1, 2004, whether or not they had volume sensors. Illinois was reportedly testing only with wheat. There was concern that testing with a single grain might not be adequate indication the device would perform accurately on other grains as some devices are adjusted to grain type. This "adjustment to type" frequently takes the form of grain specific TW calibration constants (slope or bias terms) that compensate for differences in packing density between the GMM test cell and the standard TW quart cup for each grain. This concern is most serious with devices that haven't received NTEP approval for TW. Devices that have been NTEP approved for TW will be using TW calibrations that have been evaluated for each grain type, so testing with a single grain at least verifies the weighing mechanism is functioning properly.

Conclusion: The Sector agreed that its earlier decision to make the requirement for a volume sensor nonretroactive was correct and will stand.

7. Report on OIML IR 59 "Moisture Meters for Cereal Grains and Oilseeds"

Background: At an OIML TC17/SC1 meeting in Berlin on June 22, 2001, the U.S. Delegation put forth a series of proposals to revise OIML IR59 "Moisture Meters for Cereal Grains and Oilseeds." These proposals were well received, and it was requested that the U.S. prepare a draft based on the U.S. NTEP program. A rough draft of this document was reviewed at the August 2002 GMM Sector meeting. A working draft, incorporating changes suggested by the Sector, was submitted to U.S. and International Work Groups in February 2003 for comment. NIST Weights and Measures Division (WMD), now responsible for U.S. participation and representation in the technical activities of the OIML, compiled comments to the working draft for review by representatives of the U.S. National Work Group (USNWG). The working draft was modified to address comments where it was judged appropriate. The modified working draft and a table of responses to the comments received to the working draft were distributed to USNWG members May 28, 2003. Subsequently, the Secretariat (the Peoples Republic of China) distributed the revised working draft as the "First Committee Draft" to OIML TC17/SC1 for review and comment by the member states of the subcommittee. Comments to the "First Committee Draft" were addressed by OIML TC17/SC1 at a meeting held in Beijing October 15-16, 2003. A revised "First Committee Draft," dated April 2004 incorporating changes agreed to at the Beijing meeting has been distributed to member countries. USNWG members were asked to return their comments on the latest draft to Diane Lee, NIST WMD, no later than July 30, 2004.

A meeting of TC17/SC1 was held September 20 –21, 2004, in Paris to discuss the latest draft of R59.

Discussion: Diane Lee reported that Japan had objected to the required minimum sample size of 100 g or 400 kernels or seeds, which ever is smaller, for dielectric meters (and 20 g for near infrared meters), because it ruled out meters based on the electrical resistivity of grain. These meters are used mainly for small grains, but at least one type can also measure moisture in soybeans. About 70 % of the grain moisture meters in Asia are of this type. During the Sector's discussion of this issue, it was reported that the sample size for these meters, on small grains, was 0.5 g. Some members questioned this size, wondering if a larger sample might be ground up and mixed before 0.5 g was extracted and placed between electrodes for measurement. Subsequent to the meeting, at least two models of resistive meters were found to utilize only 18 – 22 kernels when measuring short grain brown or white rice, which approximates 0.4 g.. The April 2004 draft had included the following note to address Japan's concerns about sample size:

> (Note: if another meter technology is used which requires a smaller sample size than noted above, additional testing is required to ensure that proper sampling techniques can be applied to the measurement to ensure that the measurement is representative of the grain sample.)

It was suggested that a class of "small sample size" instruments might be needed to address Japan's concerns with that class being excluded from use in the U.S. Steve Patoray, NTEP Director, pointed out that should the U.S. enter into a grain moisture meter mutual recognition agreement with OIML, the U.S. would have to have sound technical basis for excluding this class from U.S. use.

Subsequent to the Sector meeting, comments on the April 2004 draft of R59 were received from other OIML member countries. Comments were for the most part positive. The most serious objections were from Japan. They included:

1) In clause 6.1.5 the meaning of "representative size grain sample" is not clear because the statistical population is not defined in this draft. Meters could not be designed to measure the moisture content of representative size of grain samples because representativeness does not depend on the size of sample but on preparation such as mixing sample and on way of measurement. Therefore this clause should be deleted, or we should just note that the sample should be homogeneous.

2) The present draft seems to require all types of grain moisture meters to measure the temperature of a loaded sample. As we pointed out at the meeting in Beijing it is almost impossible for resistance type moisture meters to comply with the requirement due to geometrical and mechanical restriction. Therefore the present descriptions concerning temperature measurement of the sample, if they are not changed, would lead to exclude the resistance type moisture meters, whose market share is about 70 % in Asian countries.

Japan proposed removing all requirements regarding inhibiting display of moisture value when certain grain or instrument temperature limits had been exceeded.

Diane Lee has compiled the comments received from other OIML member countries and circulated a comment form to the U.S. Work Group soliciting comments in hopes of receiving feedback on the comments prior to the next meeting of OIML TC17/SC1 scheduled for September 20-21, 2004 in Paris, France.

8. Report on NTEP Type Evaluations

Cathy Brenner of the Grain Inspection, Processors and Stockyards Administration (GIPSA, formerly FGIS), the NTEP Participating Laboratory for Grain Analyzers (Grain Moisture Meters and Near Infrared Grain Analyzers) reported on Type Evaluation activity. In addition to regular grain moisture meter calibration updates, two certificates were updated to add new features following successful evaluations:

1. CC 01-063A4 – Foss Infratec 1241
   a) added protein and oil for corn and soybeans
   b) added protein for the following wheats: Durum, HRS, HRW, Hard White, SRW, Soft White; and for both 6-row and 2-row Barley
2. CC 97-073A7 – Steinlite SL95 (only units with funnel sensor are approved for TW)
   a) added test weight per bushel for all grains except Oats

Evaluations are currently underway for two additional devices: one for test weight per bushel and one for protein and oil combined.

9. Should the Grain Moisture Meter Sector and the NIR Grain Analyzer Sectors Merge?

Discussion: The Grain Moisture Meter Sector and the Near Infrared Grain Analyzer Sector (originally the Near Infrared Protein Analyzer) first met in Kansas City in December of 1991. Since their beginning, the two Sectors have met separately on successive days, often meeting jointly for part of that time to consider items of common interest. The advent of CCs listing multiple applications evaluated under either or both the Grain Moisture Meter Code and the Near Infrared Analyzer Code has increased the number of issues common to both groups. Furthermore, the Sector Chair, the technical advisors, and the vast majority of Sector members are common to both Sectors. These facts suggested that it would be more efficient for the two Sectors to merge into a single new Sector called the "Grain Analyzer Sector." In the past, when items required in-depth consideration of technical matters or development of detailed procedures, *ad hoc* subcommittees or work groups were formed to develop background information and to suggest action for consideration by the Sectors. It is envisioned that such sub-committees or work groups can be of equal or greater importance to a merged Sector dealing with more mature issues.

Following are few of the benefits of merging into a single sector:

- One meeting agenda instead of two
- One meeting summary instead of two
- More flexibility in dealing with items of common interest
- Consistency between GMM and NIR Code and Checklists

Recommendation: By consensus the Sector agreed to recommend that the NCWM Board of Directors merge the Grain Moisture Meter Sector and the Near Infrared Grain Analyzer Sector into a new Sector to be called the Grain Analyzer Sector.

10. Report on the 2004 NCWM Annual Meeting

Background/Discussion: The 89th Annual Meeting of the National Conference on Weights and Measures (NCWM) was held July 11 – 15, 2004, in Pittsburgh, Pennsylvania.

No Grain Moisture Meter (GMM) or Near Infrared (NIR) Grain Analyzer items appeared in the Specifications and Tolerances (S&T) Committee Interim Report for consideration by the NCWM at the 2004 Annual Meeting.

The National Type Evaluation Program (NTEP) Committee Interim Report contained an item relating to NTEP's work to establish bilateral and multilateral test data exchange agreements. Under such agreements and arrangements, manufacturers would be able to submit their equipment to any of the participating countries for testing to OIML recommended requirements. The resulting test data would be accepted by other participants, as a basis for issuing each country's own type approval certificate. One such agreement or arrangement is the Mutual Acceptance Arrangement (MAA) on OIML Type Evaluations recently adopted by the International Committee on Legal Metrology (CIML) at their November 2003 meeting. For additional background refer to *Committee Reports for the 89th Annual Meeting*, NCWM Publication 16.

By way of background, Steve Patoray, NTEP Director, explained that the U.S. and Canada have a bilateral MAA covering weighing devices. Under this MAA, a U.S. NTEP test report on a weighing device can be sent to Canada where a Canadian Certificate of Approval will be issued without further testing (and vice versa). A bilateral MAA agreement covering retail motor-fuel dispensers has been signed recently between the U.S. and Canada, but to date no dispensers have been evaluated under this MAA.

Steve also reported that progress was being made to establish an OIML MAA program. An additional International Bureau of Legal Metrology (BIML) staff member will be hired by January 1, 2005, to undertake the new tasks resulting from the implementation of the MAA. Initially this MAA will cover R76 (Non-automatic weighing devices) and R60 (Load Cells). A four-year time plan has been set for implementation. This will be a multilateral agreement with many countries signing a declaration of mutual confidence. Much work has yet to be done to harmonize NTEP requirements

with the OIML recommendations for these devices. A major issue in establishing MAAs is confidence in the data. Testing laboratories will be assessed either by accreditation or peer assessment using criteria that comply with ISO/IEC 17025.

With OIML International recommendations still in the draft stage for GMMs and NIR analyzers, it will be some time before MAAs are in place for these devices. This is, however, an issue that the Sector members may want to watch closely to see how MAAs might impact future type evaluation testing and certification of GMMs and NIR Grain Analyzers.

11. Multiple Application Certificates

Background: During the 2003 NCWM Interim Meeting in Jacksonville, Florida, the NTEP Committee reviewed the Sectors' recommendation to issue a single Certificate of Conformance to devices evaluated using two inter-related codes. Since that time there has been the possibility of dual certification for moisture plus protein and oil, and now test weight per bushel. The first dual certificates became effective July 1, 2004, (97-073A7 and 01-063A4). The two areas of change are in the "For:" box on page 1 and on the last page with the calibration information.

In the "For:" box, the certificates now identify the device as a Grain Analyzer instead of a Grain Moisture Meter or Near Infrared Grain Analyzer. The device type is then followed by the Application(s) that the device is approved for, in alphabetical order (Moisture, Oil, Protein, Starch, Test Weight). This information matches the current NTEP Certificate of Conformance searchable database.

The page for the calibration information also lists the applications in alphabetical order. For example, if a meter were approved for moisture, oil, protein, and test weight per bushel for corn, the calibration listing for corn would be listed as:

Corn
Designation: CORN
Moisture: ABC123
Moisture Range - Approved: 10 - 30 %
Moisture Range - Pending: 8 - 40 %
Oil: BCD234
Protein: CDE345
Native Moisture Basis: 0 %
Test Weight per Bushel: Approved

Discussion: The Sectors reviewed the new dual certificates. The Sector agreed that the revised certificates generally looked good and commended Cathy Brenner for a job well done. The following suggestions were made to clarify some of the information on the Calibration page:

a. Separate the moisture calibration information from the information on calibrations for other constituents (Protein, Oil, Starch), perhaps using a dotted line.
b. Make it clear that the Approved and Pending moisture ranges apply only to moisture measurements. An approved moisture range of 8-40 % does NOT mean that accurate Protein measurements can be made on samples having 40 % moisture.
c. Make it clear that the Intercept (Bias) note "Varies by instrument" applies only to calibrations for constituents other than moisture (e.g., Protein, Oil, Starch). It does NOT apply to the Moisture calibration. If a moisture bias term is used, it MUST be part of the grain moisture calibration and be the same for all instruments of like type. [Ref., Handbook 44, §5.56(a), Paragraph S.2.4.3.].

In a related matter, it was pointed out that the revised application form for NTEP testing is unclear. Steve Patoray, NTEP Director, suggested that information could be added to the "Evaluation Description" section to indicate which parts of the form must be completed when a box was checked for the type of evaluation being requested.

Questions were also raised about fees involved in Phase I evaluations and Phase II (Ongoing Calibration Program). These fees (for NCWM members) and their frequency are summarized in the table below:

			NTEP Laboratory fees	Frequency
Phase I NTEP Evaluation	Non-refundable application fee $800	Certificate processing fee $150	At NTEP Lab hourly rates based on actual hours. ($10,000 -$25,000 and up depending on tests involved.)	Once per type/pattern.
Maintenance fee	$350			Annually
Phase II Ongoing Calibration Program. (applicable to grain moisture meters only)		Certificate processing fee $150	Per Interagency Agreement. Depends on total number of meter types in the OCP	Annually

12. Time and Place for Next Meeting

The next meeting is tentatively planned for the week of August 22, 2005, in the Kansas City, MO, area. Meetings will be held in one of the meeting rooms at the National Weather Service Training Center if available. The meeting room will be reserved for Wednesday, August 24 and Thursday, August 25. Sector members are asked to hold both these days open pending determination of exact meeting times and meeting duration. Final meeting details will be announced by late April 2005.

If you would like to submit an agenda item for the 2005 meeting, please contact Steve Patoray, NTEP technical director, at spatoray@mgmtsol.com, G. Diane Lee, NIST technical advisor, at diane.lee@nist.gov, or Jack Barber, technical advisor, at jbarber@motion.net by April 1, 2005.

Appendix A – NTETC Grain Moisture Meter Sector Recommendations for Amendments to Publication 14

Grain Moisture Meters Recommended Amendments and Changes to the 2004 Edition of Publication 14			
Section Number	**Amendment/Change**	**Page**	**Source**
Section IV. Tolerances for Calibration Performance	Add item c. to establish an overall calibration bias requirement based on up to three years of available data. Change wording in paragraph preceding item a. and in paragraph following item c. to reflect addition of item c.	GMM-5 through GMM-6	08/04 GMM Sector Item 3
Section VII.B. Accuracy, Precision, and Reproducibility	Change the Minimum Test Weight per Bushel Ranges in the Table in §VII.B. to facilitate selection of test-set samples.	GMM-11	08/04 GMM Sector Item 4
Section VII.B. Accuracy, Precision, and Reproducibility	Change tolerances for repeatability (precision) for Corn and Oats to more realistic value.	GMM-13	08/04 GMM Sector Item 5

National Type Evaluation Technical Committee (NTETC)
Near Infrared (NIR) Grain Analyzer Sector Annual Meeting

August 26-27, 2004 - Kansas City, Missouri
Draft Summary of Decisions

Agenda Items

Note: Because of common interest, items 1 through 5, above, were considered in a joint session of the NIR Grain Analyzer and the Grain Moisture Meter Sectors

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c. Make it clear that the Intercept (Bias) note "Varies by instrument" applies only to calibrations for constituents other than moisture (e.g., Protein, Oil, Starch). It does NOT apply to the Moisture calibration. If a moisture bias term is used, it MUST be part of the grain moisture calibration and be the same for all instruments of like type. [Ref., Handbook 44, §5.56(a), Paragraph S.2.4.3.].

In a related matter, it was pointed out that the revised application form for NTEP testing is unclear. Steve Patoray, NTEP Director, suggested that information could be added to the "Evaluation Description" section to indicate which parts of the form must be completed when a box was checked for the type of evaluation being requested.

Questions were also raised about fees involved in Phase I evaluations and Phase II (Ongoing Calibration Program). These fees (for NCWM members) and their frequency are summarized in the table below:

			NTEP Laboratory fees	Frequency
Phase I NTEP Evaluation	Non-refundable application fee $800	Certificate processing fee $150	At NTEP Lab hourly rates based on actual hours. ($10,000 -$25,000 and up depending on tests involved.)	Once per type/pattern.
Maintenance fee	$350			Annually
Phase II Ongoing Calibration Program. (applicable to grain moisture meters only)		Certificate processing fee $150	Per Interagency Agreement. Depends on total number of meter types in the OCP	Annually

5. Time and Place for Next Meeting

The next meeting is tentatively planned for the week of August 22, 2005, in the Kansas City, MO, area. Meetings will be held in one of the meeting rooms at the National Weather Service Training Center if available. The meeting room will be reserved for Wednesday, August 24 and Thursday, August 25. Sector members are asked to hold both these days

open pending determination of exact meeting times and meeting duration. Final meeting details will be announced by late-April 2005.

If you would like to submit an agenda item for the 2005 meeting, please contact Steve Patoray, NTEP technical director, at spatoray@mgmtsol.com, G. Diane Lee, NIST technical advisor, at diane.lee@nist.gov, or Jack Barber, technical advisor, at jbarber@motion.net by April 1, 2005.

6. Report on OIML TC17/SC8 IR for Protein Measuring Instruments for Cereal Grain

Background:

OIML TC17/SC8, charged with developing an International Recommendation (IR) for Protein Measuring Instruments for Cereal Grain, held its first meeting May 31 and June 1, 2004, in Sydney, Australia. Representatives from Australia, Japan, New Zealand, and the United States attended the meeting. Australia, as the secretariat of the subcommittee, developed an outline of the Recommendation on Protein Measuring Instruments for Cereal Grain (March 2004) that was circulated to participating nations (Australia, Brazil, Canada, Czech Republic, Germany, Japan, Poland, Republic of Korea, Russia and the United States) for comments. In the U.S. the document was circulated to the U.S. National Work Group (USNWG) for comments. The comments received from the U.S. and Germany were discussed at the TC17/SC8 meeting in Australia. The comments for the most part were accepted. Additionally, TC17/SC8 agreed to the following changes:

a. The scope will be expanded to include wheat, barley, corn, soybeans and rice

b. Maximum permissible errors (MPE) and Moisture Basis: Publication 14 will be used to establish the maximum permissible errors for wheat, barley, corn and soybeans. China will provide information for tolerances on rice. Moisture basis will be determined by the national measurement authority.

c. The section for sampling will be updated to address the U.S. comments.

d. The technology for protein measurements will not be specific.

e. The standard will incorporate appropriate sections of OIML D9

f. The instrument monitoring process will be left up to the national measurement authority.

g. The document will be updated so that the April 2004 Final Draft of the **International vocabulary of basic and general terms in metrology** (VIM) definitions are included.

h. The reference method will be determined by the national measurement authority.

i. The Recommendation on protein measuring instruments will be drafted as close as possible with the latest draft of OIML R59.

j. The document will include susceptibility to dust.

k. Decision to test non-indirect measuring devices will be at the discretion of the national measurement authority.

Discussion: A revised draft incorporating the changes agreed upon at the Sydney meeting was distributed with the Agenda for the Sector's August 2004 meeting. Australia, the Secretariat of TC17/SC8, used portions of the NIR Grain Analyzer Chapter of Publication 14 in this draft outline recommendation. As of the Sector meeting, Diane Lee, NIST WMD reported that comments had been received only from Randy Burns, Arkansas Bureau of Standards. Randy's comments were mostly editorial in nature. Dr. Charles Hurburgh, Iowa State University, mentioned that **NIR 2005,** the 12th International Conference on Near Infrared Spectroscopy, would be held April 10-15, 2005, in Auckland, New Zealand. He suggested that this would be an ideal time for TC17/SC8 to meet because all the recognized names in the field of Near Infrared Spectroscopy would be present. Dr. Hurburgh offered the following comments on the latest draft:

- There should be explicit mathematical descriptions in addition to statements for many terms.
- The MEPS in the table of tolerances are extremely tight for the U.S. where there is not variety release control and therefore much more variation in germplasm.
- There are many places where the basis of determination (i.e., the number of samples used) is not stated. The background statistics are always based on some number of observations.
- The draft defines a networked instrument as one that is linked, either electronically or manually under a quality system, to a certified measuring instrument and/or a whole grain certified reference material and/or the reference method of Annex A so that its performance may be monitored on a daily basis or according to a schedule set by the quality system administrator. I don't think the U.S. is ready to accept that a company with a certified quality management system is metrologically the same as if the instruments are actually electronically linked. This would be a huge policy change/modification for the U.S. I think it is the way to move, but not sure we are ready yet.
- The draft also states that networked instruments subject to a quality control system may be adjusted within the range of MPES to improve the accuracy of the instrument. This would not be consistent with U.S. metrological practice.
- The draft does not cover the case where calibrations have been derived on a moisture basis equal to Mref.
- Only one unit is required for type evaluation. One unit is not sufficient to verify that production meets type, nor does it allow testing for calibration transfer methods.

Dr. Hurburgh will be sending a complete write-up of his comments with detailed comments/suggestions to Diane Lee.

Because several of the members of TC17/SC8 are also members of TC17/SC1 (OIML R 59 Moisture Meters For Cereal Grain and Oilseeds), which met in Paris in September 20-21, 2004, it had been proposed that the next meeting of TC17/SC8 to discuss the latest draft of the "Outline of a Recommendation on Protein Measuring Instruments for Cereal Grain" be held in Paris the day following the TC17/SC1 meeting. The TC17/SC8 meeting was not held following the TC17/SC1 meeting.

2004 GMM/NIR Sector Meeting Attendees
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Appendix C

National Type Evaluation Technical Committee
Measuring Sector Annual Meeting

October 21-22, 2004, Gulfport, Mississippi
Draft Summary of Decisions

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1. Recommendations to Update to NCWM Publication 14 to Reflect Changes to NIST Handbook 44

Source: NIST/WMD

Background: The 89th National Conference on Weights and Measures (NCWM) adopted the following items that will be reflected in the 2005 Edition of NIST Handbook 44 and NCWM Publication 14. These items are part of the agenda to inform the Measuring Sector of the NCWM actions and recommend changes to NCWM Publication 14.

Recommendation: The Sector will review and, if acceptable, recommend to the NTEP Committee adoption of the following changes to Publication 14 based on changes to NIST Handbook 44:

A. S.2.2.1. Multiple Measuring Devices with a Single Provision for Sealing

Background: During its 2004 Annual Meeting, the NCWM agreed to add a new paragraph to NIST Handbook 44, Section 3.30. Liquid-Measuring Devices S.2.2.1. Multiple Measuring Elements with a Single Provision for Sealing as follows:

S.2.2.1. Multiple Measuring Elements with a Single Provision for Sealing. - A change to the adjustment of any measuring element shall be individually identified.
[Nonretroactive as of January 1, 2005]

Note: Examples of acceptable identification of a change to the adjustment of a measuring element include but are not limited to:

(a) a broken, missing, or replaced physical seal on an individual measuring element,
(b) a change in a calibration factor for each measuring element,
(c) display of the date of or the number of days since the last calibration event for each measuring element or,
(d) a counter indicating the number of calibration events per measuring element.

Recommendation: Add a new Code Reference S.2.2.1. to Section 9, of the Liquid-Measuring Devices Checklist and Test Procedures of NCWM Pulication14, Measuring Devices, 2004 edition as follows:

Code Reference: S.2.2.1. Multiple Measuring Devices with a Single Provision for Sealing

9.6 S.2.2.1. Multiple Measuring Elements with a Single Provision for Sealing. - A change to the adjustment of any measuring element shall be individually identified.

Note: Examples of acceptable identification of a change to the adjustment of a measuring element include but are not limited to:

(a) a broken, missing, or replaced physical seal on an individual measuring element,
(b) a change in a calibration factor for each measuring element,
(c) display of the date of or the number of days since the last calibration event for each measuring element or,
(d) a counter indicating the number of calibration events per measuring element.

Renumber succeeding Section 9 paragraphs accordingly.

B. S.4.4.2. Location of Marking Information

Background: During its 2004 Annual Meeting, the NCWM agreed to amend Handbook 44 Section 3.30 Liquid-Measuring Devices paragraph S.4.4.2. Location of Marking Information as follows:

S.4.4.2. Location of Marking Information; Retail Motor-Fuel Dispensers. - *The required marking information in the General Code, Paragraph G-S.1. shall appear as follows:*

(a) ~~*Placement of this information shall not be on a portion of the device that can be readily removed or interchanged without the use of a tool separate from the device.*~~
shall be within 24 to 60 inches from the base of the dispenser;

(b) ~~*The information shall appear 24 to 60 inches from the base of the dispenser when placed on the outside of the device.*~~
may be internal and/or external provided the information is permanent and easily read;

(c) ~~***When placed behind an access door or panel the information shall appear 24 inches to 60 inches from the base of the dispenser in a readily legible position. The use of a dispenser key shall not be considered a tool separate from the device.***~~
shall be on a portion of the device that cannot be readily removed or interchanged (i.e., not on a service access panel).

Note: the use of a dispenser key or tool to access internal marking information is permitted.

[Nonretroactive as of January 1, 2003]
(Added 2002) **(Amended 2004)**

Recommendation: Modify Section 11, paragraph 11.3. of the Liquid-Measuring Devices Checklist and Test Procedures of NCWM Pulication14, Measuring Devices, 2004 edition as follows:

Code Reference: S.4.4.2. Location of Marking Information

11.3. The required marking information in the General Code, paragraph G-S.1. shall be located as follows:

(a) ~~**Placement of this information shall not be on a portion of the device that can readily removed or interchanged without the use of a tool separate from the device.**~~ **shall be within 24 to 60 inches from the base of the dispenser;**

(b) ~~**When placed on the outside to the device the information shall appear 24 to 60 inches from the base of the dispenser.**~~ ***may be internal and/or external provided the information is permanent and easily read;***

(c) ~~**When placed behind an access door or panel the information shall appear 24 inches to 60 inches from the base of the dispenser in a readily legible position. The use of a dispenser key shall not be considered a tool separate from the device.**~~ **shall be on a portion of the device that cannot be readily removed or interchanged (i.e., not on a service access panel).**

Note: the use of a dispenser key or tool to access internal marking information is permitted.

Decision: The Sector reviewed, accepted, and recommends the NTEP Committee adopt the proposed changes to NCWM Publication 14.

Carry-over Items:

2. On-Screen Display of G.S.1. Requirements for Software-Based Built- for-Purpose Devices

Source: Returned from NCWM S&T Committee

Background: At its 2003 Annual Meeting, the NCWM adopted a proposal that provides alternate methods, other than physical marking, for meeting some of the requirements of Handbook 44 G-S.1. for "not-built-for-purpose" devices. At that meeting the NCWM S&T Committee also reviewed an SMA proposal that provided similar alternate marking methods for "built-for-purpose" devices. The S&T Committee concluded that the proposal for "built-for-purpose" devices required further review and development by the NTETC Technical Sectors and the regional weights and measures associations.

Prior to the October 2003 NTETC Measuring Sector Meeting, the WMD NTETC technical advisors developed an alternate proposal to modify G.S.1. and add a Table G.S.1. that provided alternate methods other than physical markings for meeting some of the requirements of G-S.1. for both "not-built-for-purpose" and "built-for-purpose" devices.

At its 2003 meeting, the Measuring Sector agreed with the WMD proposal in principle, but recommended some small changes to simplify the table. The Sector agreed to forward the modified proposal for G-S.1. in tabular format to the NCWM S&T Committee for consideration.

At the 2004 NCWM Annual Meeting during the open hearing, the SMA stated that S&T Item 310-1, the proposal to modify G-S.1., should not go forward for a vote because a ballot of the Weighing Sector on the proposal failed to provide clear support for the item. A manufacturer stated that the term "microprocessor" is not appropriate because their devices contain numerous microprocessors. Another manufacturer stated that the requirement for marking the current software version number would place an unrealistic burden on their company. The Committee agreed that sufficient opposition and questions were raised during the open hearing to demonstrate the item is not sufficiently developed to be a voting item at that meeting. The Committee agreed to make Item 310-1 an information item to be returned to the Weighing and Measuring Sectors for further development.

Recommendation: G-S.1. Identification. - WMD has revised language in the 2004 S&T Agenda Item 310-1. Additions and changes to the proposal to the 2004 S&T Agenda Item 310-1 are highlighted in gray text.

Add new General Code Terms and Definitions as follows:

measuring device (general) – a device (instrument) intended to be used to make measurements, alone or in conjunction with supplementary devices. (VIM)

measuring system (general) - an instrument or group of instruments that serve to make measurements, alone or in conjunction with supplementary devices. (VIM)

electronic devices – a device operating by the principles of electronics, which may consist of one or more subassemblies and perform a specific function(s). (ASTM)
or
electronic measuring device – a measuring instrument intended to measure a quantity using electronic means and/or equipped with electronic devices. (D11)

not-built-for-purpose device. Any electronic peripheral or auxiliary device or element which was not originally manufactured with the intent that it be used as, or part of, a weighing or measuring device or system.

metrological revision – a revision to a measuring instrument, device, or system that affects its metrological integrity (e.g., physical modifications or modifications to embedded, programmable, or downloadable software).

Amend the definition of built-for-purpose device as follows:

built-for-purpose device – any main, peripheral, or auxiliary device or element which was manufactured with the intent that it be used as, or part of, a ~~weighing or~~ measuring device or system.

Amend General Code paragraph G-A.1. Commercial and Law Enforcement Equipment as follows:

G-A.1. Commercial and Law Enforcement Equipment. - These specifications, tolerances, and other technical requirements apply as follows:

(a) To commercial ~~weighing and~~ measuring devices or systems ~~equipment~~; that is, to weights and measures ~~weighing~~ and measuring devices or systems commercially used or employed in establishing the ~~size,~~ quantity, ~~extent, area,~~ or measurement of quantities, ~~things, produce, or articles for~~ distribution or consumption, purchased, offered, or submitted for sale, hire, or award, or in computing any basic charge or payment for services rendered on the basis of quantity determination ~~weight or measure~~.

(b) To any accessory attached to or used in connection with a commercial ~~weighing or~~ measuring device when such accessory is so designed that its operation affects the accuracy of the device.

(c) To ~~weighing and~~ measuring devices or systems ~~equipment~~ in official use for the enforcement of law or for the collection of statistical information by government agencies.

(These requirements should be used as a guide by the weights and measures official when, upon request, courtesy examinations of noncommercial equipment are made.)

Amend General Code paragraph G-S.1. Identification as follows:

G-S.1. Identification. - All equipment, except weights and separate parts necessary to the measurement process, but not having any metrological effect, shall be clearly marked **in accordance with Table G-S.1.** for the purposes of identification, with the following information:

(a) the name, initials, or trademark of the manufacturer or distributor;

(b) a model designation that positively identifies the pattern, ~~or~~ design, or metrological revision of the device;

(c) the model designation shall be prefaced by the term "Model," "Type," or "Pattern." These terms may be followed by the term "Number" or an abbreviation of that word. The abbreviation for the word "Number" shall, as a minimum, begin with the letter "N" (e.g., No or No.). The abbreviation for the word "Model" shall be "Mod" or "Mod."
[Nonretroactive January 1, 2003]
(Added 2000) (Amended 2001)

[Note: Prefix lettering may be initial capitals, all capitals or all lower case.]

(d) except for equipment with no moving or electronic component parts and not-built-for-purpose, ~~software-based~~ electronic devices, a nonrepetitive serial number;
[Nonretroactive as of January 1, 1968]

~~(e) for **not-built-for-purpose, software-microprocessor** based devices the current software version designation **or revision number**;~~
~~(Added 2003)~~

(ef) the serial number shall be prefaced by words, an abbreviation, or a symbol, that clearly identifies the number as the required serial number; and
[Nonretroactive as of January 1, 1986]

(fg) the serial number shall be prefaced by the words "Serial Number" or an abbreviation of that term. Abbreviations for the word "Serial" shall, as a minimum, begin with the letter "S," and abbreviations for the word "Number" shall, as a minimum, begin with the letter "N" (e.g., S/N, SN, Ser. No, and S No.).
[Nonretroactive as of January 1, 2001]

*(gh) ~~F~~[**for** devices that have an NTEP Certificate of Conformance (CC), the CC Number or a corresponding CC addendum number ~~**shall be**~~ prefaced by the terms "NTEP CC," "CC," or "Approval." These terms may be followed by the term "Number" or an abbreviation of that word. The abbreviation for the word "Number" shall, as a minimum, begin with the letter "N" (e.g., No or No.).*
[Nonretroactive as of January 1, 2003]

The required information shall be so located that it is readily observable without the necessity of the disassembly of a part requiring the use of any means separate from the device.
(Amended 1985, 1991, 1999, 2000, 2001 and 2003)

Delete General Code paragraph G-S.1.1. Location of Marking Information for Not-Built-for-Purpose, Software-Based Devices and renumber G-S.1.2. Remanufactured Devices and Remanufactured Main Elements as follows:

G-S.1.1. Location of Marking Information for Not-Built-for-Purpose, Software-Based Devices. - For not-built-for-purpose, software-based devices, the following shall apply:

~~*(a) the manufacturer or distributor and the model designation shall be continuously displayed or marked on the device (see note below), or*~~

~~*(b) the Certificate of Conformance (CC) Number shall be continuously displayed or marked on the device (see note below), or*~~

~~*(c) all required information in G-S.1. Identification. (a), (b), (c), (e), and (h) shall be continuously displayed. Alternatively, a clearly identified "view only" System Identification, G-S.1. Identification, or Weights and Measures Identification shall be accessible through the "Help" menu. Required information includes that information necessary to identify that the software in the device is the same type that was evaluated.*~~

~~*Note: Clear instructions for accessing the remaining required G-S.1. information shall be listed on the CC. Required information includes that information necessary to identify that the software in the device is the same type that was evaluated.*~~
~~*[Nonretroactive as of January 1, 2004]*~~
~~**(Added 2003)**~~

G-S.1.12. Remanufactured Devices and Remanufactured Main Elements. - *All remanufactured devices and remanufactured main elements shall be clearly and permanently marked for the purposes of identification with the following information:*

(a) the name, initials, or trademark of the last remanufacturer or distributor;

(b) the remanufacturer's or distributor's model designation if different than the original model designation.
[Nonretroactive as of January 1, 2002]
(Added 2001)

Note: Definitions for "manufactured device," "repaired device," and "repaired element" are also included (along with definitions for "remanufactured device" and "remanufactured element") in Appendix D, Definitions.

Add new Table G-S.1. Identification as follows:

Table G-S.1. Identification		
	Built-for-Purpose Instruments, Elements, or Systems	**Not-Built-for-Purpose Devices or Elements**
Name, initials, or trademark of the manufacturer or distributor	**M**	**D[2]**
Model designation	**M[1]**	**D[2]**
Specific model designation	**M[1] or D**	
Serial number	**M**	**Not required**
Metrological revision designation[3]	**M or D**	**D**
Certificate of Conformance (CC) number	**M or D**	**D[2]**
M: **Physically and permanently marked**		

Table G-S.1. Identification		
	Built-for-Purpose Instruments, Elements, or Systems	**Not-Built-for-Purpose Devices or Elements**
D:	***Either: (1) displayed by accessing a clearly identified "view only" System Identification, G-S.1. Identification, or Weights and Measures Identification accessible through the "Help" menu. Required information includes that information necessary to identify that the software in the device is the same type that was evaluated, or (2) continuously displayed. Note: For revision or software version number, clear instructions for accessing this information shall be listed on the CC in lieu of the "Help" menu. Required information includes that information necessary to identify that the software in the device is the same or subsequent type that was evaluated.*** ***(Nonretroactive as of January 2004)***	
Note 1:	***As a minimum, the model designation (positively identifying the pattern, design, type, series, generic, or trademark designation) must be marked on the device. If the model designation changes with differing parameters such as size, features, options, intended application, not Handbook 44 compliant, construction, etc., the specific model designation shall be physically marked or continuously displayed or be capable of being displayed.*** ***(Nonretroactive as of January 200X)***	
Note 2:	***As a minimum, either the manufacturer or distributor and the model designation, or the CC Number shall be continuously displayed. Clear instructions for accessing the remaining required G-S.1. information shall be listed on the CC, which may be available as an unaltered copy of the CC printed by the device or through another on-site device.*** ***(Nonretroactive as of January 200X)***	
Note 3:	***Metrological revision designation may include hardware or software revision (version).***	

Decision: The Sector discussed the amended WMD proposal and the recommendations of the 2004 Weighing Sector and agreed to forward a recommendation the NCWM S&T Committee that Item 310-1 be withdrawn from the 2005 S&T Agenda.

3. Testing Required for an Electronic Indicator with a CC Interfaced with a Measuring Element with a CC Not Previously Evaluated Together

Source: Returned from NCWM S&T Committee

Background: Prior to the October 2003 Measuring Sector Meeting, a work group submitted a proposal to add a new paragraph N.X. to Handbook 44 Sections 3.30., 3.31., 3.32., and 3.37. and an alternate proposal to add a new Section T. to Publication 14, for consideration. The work group proposed a new section 44 to be added to the Liquid-Measuring Devices Checklist and Test Procedures of Publication 14, 2003 Edition.

At its 2003 meeting, the Measuring Sector agreed to forward the following Proposal 1 for addition to Publication 14 to the NCWM NTEP Committee for consideration, and the following Proposal 2 to the NCWM S&T Committee for consideration. The Sector strongly believed that, for the benefit of weights and measures officials, the proposed test notes for determining the compatibility of the various components of a weighing of measuring system need to be added to the General Code Section of Handbook 44.

Proposal 1. Add a new section "T" to Publication 14 to guide NTEP Inspectors as to when additional testing is necessary to determine compatibility between components as follows:

Testing Required to Interface Components with Individual CC's that were Not Previously Tested Together.

Additional testing by an NTEP Participating Laboratory is not required if an electronic indicator is interfaced to a measuring element provided all of the following are true:

a) the communication means for the input to the electronic indicator (pulse, frequency, serial, etc.) has been previously tested with a measuring element listed on a CC;

b) the communication means for the output of the measuring element (pulse, frequency, serial, etc.) has been previously tested with an electronic indicator listed on a CC;
c) the communication means to be used for the electronic indicator input is the same as the communication means to be used for the measuring element output (pulse-pulse, frequency-frequency, serial-serial, etc.) and both devices are being used within the current parameters listed on their respective CCs;
d) the devices are communicating with each other and the system in which they are installed can be accurately calibrated; and
e) if required, Handbook 44 compliant tickets can be printed.

Note: NTEP may require initial or complete evaluation of new technologies or applications.

Add additional checklist section 44 (Page LMD XX) to Publication 14 as follows:

44. Additional Checklist and Test Procedures for Interfacing Components

When examining the interface between electronic indicator and a measuring element, the following must be considered:

44.1	**Does the electronic indicator have a CC?**	**Yes** ☐	**No** ☐
44.2	**Is the electronic indicator being used within the application limits of the CC?**	**Yes** ☐	**No** ☐
44.3	**Does the measuring element have a CC?**	**Yes** ☐	**No** ☐
44.4	**Is the measuring element being used within the application limits of the CC?**	**Yes** ☐	**No** ☐
44.5	**Can the system in which both devices are installed be accurately calibrated?**	**Yes** ☐	**No** ☐
44.6	**Can a ticket (if required) be properly printed?**	**Yes** ☐	**No** ☐
44.7	**Are interfaces, other than mechanical or pulse interfaces (e.g., 4-20 mA or frequency interfaces), being used as defined by the appropriate CC?**	**Yes** ☐	**No** ☐

Proposal 2. Add a new paragraph G-N.3. Compatibility of Indicators and Weighing or Measuring Elements to Handbook 44 to clarify what requirements must be met to interface an indicating element and a weighing or measuring element when each element has its own CC listing compatible communication specifications, but such elements have not been previously evaluated together on a single NTEP CC.

G-N.3. Compatibility of Indicators and Weighing or Measuring Elements. – To be considered compatible, the following conditions shall be met:

(a) the communication means used for the input to the electronic indicator (analog, digital, pulse, frequency, serial, etc.) has been previously evaluated with a weighing or measuring element;

(b) the communication means used for the output of the weighing or measuring element (analog, digital, pulse, frequency, serial, etc.) has been previously evaluated with an electronic indicator;

(c) the communication means used for the electronic indicator input is the same as the communication means used for the weighing and measuring element output (analog-analog, digital-digital, pulse-pulse, frequency-frequency, serial-serial, etc.);

(d) the elements are communicating with each other and the device or system into which they are installed can be accurately calibrated; and

(e) if required, Handbook 44 compliant tickets can be printed.

At the 2004 NCWM Interim Meeting, the NTEP Committee approved the addition of the information contained in Proposal 1 above to the 2004 Edition of Publication 14. The S&T Committee heard several comments indicating that the proposal to add a new paragraph G-N.3. Compatibility of Indicators and Weighing or Measuring Elements to Handbook 44 is not sufficiently developed to move forward. One manufacturer stated that his company manufactures measuring and indicating elements or components that can be interfaced to provide a complete measuring system. He believes this item needs to be in Handbook 44 for the use of the field official and that the proposal as written provides at least some guidance on compatibility of components. The Committee agreed that the item is not sufficiently developed to move forward. The Committee decided to withdraw the proposal from the S&T Committee agenda until it is further developed and resubmitted by the NTETC Weighing and Measuring Sectors.

Recommendation: The Sector needs to determine if it wants to continue to develop language to be added to Handbook 44 or if the information added to Publication 14 is sufficient to address the original concerns of manufacturers regarding when additional testing is necessary to determine compatibility between components.

Decision: The members generally agreed that the language added to Publication 14 last year was sufficient to address the original concerns of manufacturers regarding when additional testing is necessary to determine compatibility between components. The Sector did not propose any new language for Handbook 44 be submitted to the NCWM S&T Committee for consideration. The Sector agreed that the item should be dropped from the Measuring Sector's Agenda.

4. Tolerance for Product Depletion Test

Source/Background: At its October 2003 meeting, the Sector agreed to forward the following proposal to the NCWM S&T Committee for consideration.

N.4.2. Special Tests (Except Milk-Measuring Systems), N.4.5. Product Depletion Test, and T.5. Product Depletion Test

N.4.2. Special Tests (Except Milk-Measuring Systems). - "Special" tests shall be made to develop the operating characteristics of a measuring system and any special elements and accessories attached to or associated with the device. Any test except as set forth in N.4.4.1. **or N.4.5.** shall be considered a special test. Special tests of a measuring system shall be made ~~as follows:~~

~~**(a)** **A**~~at a minimum discharge rate of 20 % of the marked maximum discharge rate or at the minimum discharge rate marked on the device, whichever is less.

~~**(b) To develop operating characteristics of the measuring system during a split compartment delivery.**~~

N.4.5. Product Depletion Test. - The effectiveness of the vapor eliminator shall be tested by depleting the product supply and continuing until the lack of fluid causes the meter indication to stop completely for at least 10 seconds. If the meter indication fails to stop completely for at least 10 seconds, continue to operate the system for 3 minutes. The test shall be completed by switching to another compartment with sufficient product on a multi-compartment vehicle, or by adding sufficient product to a single-compartment vehicle. When adding product to a single-compartment vehicle, allow appropriate time for any entrapped vapor to disperse before continuing the test.
(Added 200X)

T.5. Product Depletion Test. - The difference in the delivered volumes for the normal test and the product depletion test shall not exceed the tolerance shown in Table T.5., and all test results shall be within applicable tolerances.

Table T.5. Tolerances For Vehicle Tank Meters On Product Depletion Tests, Except Milk Meters	
Manufacturer's rated capacity (Maximum gpm)	**Maintenance and acceptance tolerances**
Up to 125	**125 in^3**
126 to 250	**200 in^3**
251 to 500	**300 in^3**
501 to 750	**400 in^3**
Over 751	**600 in^3**

At the 2004 NCWM Interim Meeting, the Meter Manufacturers Association (MMA) voiced support for the intent of the alternative proposal submitted by the NTETC Measuring Sector provided T.4. is modified by removing the words "and all test results shall be within applicable tolerances." A Maryland Weights and Measures official noted that the proposal if modified as the MMA recommends provides a substantial change in tolerance; however, Maryland is in favor of the concept because the tolerance for a given meter is not linked to the size of the prover used for testing. A New York official stated that a product depletion test should be viewed as the test of a "disturbance," similar to a test for radio frequency interference (RFI) on a scale. New York preferred a tolerance expressed as a flat percentage and suggested a tolerance of 0.5 % of the meter's marked maximum flow rate over the step tolerances in the proposed Table T.5. A representative from Measurement Canada indicated there is an opportunity for the United States and Canada to harmonize the requirement for a product depletion test. Canada is currently using a tolerance of 0.25 % of the meter's marked maximum flow rate applied to the product depletion test results; however, Measurement Canada is still conducting a study to determine if the 0.25 % tolerance is appropriate. The Committee agreed that Item 331-2 should remain an information item and be returned to the NTETC Measuring Sector for review and further development at its fall 2004 meeting.

Recommendation: Will Wothlie (Maryland NTEP Laboratory) and Dick Suiter (NIST) have developed a new proposal for consideration by the Sector. The amended proposal will harmonize Handbook 44 tolerances for product depletion tests with the Measurement Canada tolerances. The Sector was asked to review the following proposal and if the members agreed forward it to the NCWM S&T Committee for consideration.

N.4.2. Special Tests (Except Milk-Measuring Systems). - "Special" tests shall be made to develop the operating characteristics of a measuring system and any special elements and accessories attached to or associated with the device. Any test except as set forth in N4.4.1. **or N.4.5.** shall be considered a special test. Special tests of a measuring system shall be made as follows:

~~**(a) A**~~at a minimum discharge rate of 20 % of the marked maximum discharge rate or at the minimum discharge rate marked on the device whichever is less;

~~**(b) To develop operating characteristics of the measuring system during a split compartment delivery.**~~

N.4.5. Product Depletion Test. - The effectiveness of the vapor eliminator shall be tested by depleting the product supply and continuing until the lack of fluid causes the meter indication to stop completely for at least 10 seconds. If the meter indication fails to stop completely for at least 10 seconds, continue to operate the system for 3 minutes. The test shall be completed by switching to another compartment with sufficient product on a multi-compartment vehicle, or by adding sufficient product to a single compartment vehicle. When adding product to a single compartment vehicle, allow appropriate time for any entrapped vapor to disperse before continuing the test.
(Added 200X)

T.5. Product Depletion Test. - The difference in the delivered volumes for the normal test and the product depletion test shall not exceed the tolerance shown in Table T.5.

Table T.5. Tolerances For Vehicle Tank Meters On Product Depletion Tests, Except Milk Meters	
Meter size	**Maintenance and acceptance tolerances**
Up to but not including 75 mm (3.0 inches)	**2.25 liters (137 in^3)[1]**
75 mm (3.0 inches) or larger	**3.75 liters (229 in^3)[2]**
[1] Based on a test volume of approximately 900 liters (238 gal) **[2] Based on a test volume of approximately 1500 liters (396 gal)**	

Example: "+25 cu in" error normal test, + or – 137 cu in, for product depletion total error; + 162 cu in or – 112 cu in.

Note: The result of the product depletion test may fall outside of the applicable test tolerance.

Decision: The Sector agreed to forward the proposal to the NCWM and Southern Weights and Measures Association S&T Committees for consideration, with the addition of an example and a note stating that the result of the product depletion test may fall outside of applicable tolerance as shown above.

5. Product Family Tables for MAG Meters

Source: Liquid Controls LLC

Background/ Discussion: At the 2002 Sector Meeting, a working group was formed to address the issue of product family criteria. The Sector will consider the recommendations of the work group.

Prior to the 2003 Sector Meeting the technical advisor was informed that this work group was not ready to present a recommendation; however the work group requested that the item remain on the agenda for further development.

At the 2003 Sector Meeting, the Sector agreed that an expanded work group should be formed to develop family product tables for Mag Meters, Ultrasonic Meters, and Turbine Meters for consideration by the Sector at its next meeting. The members of the new work group are: Charlene Numrych (Liquid Controls), Chair; Richard Miller (FMC); Joe Buxton (Daniel Measurement & Control); and Randy Byrtus (Measurement Canada). Charlene volunteered to contact other manufacturers to invite them to participate in the work group.

The work group formed at the 2003 Sector Meeting identified four turbine meter manufacturers that could provide data on a variety of products measured using this type of meter. Only one mag meter manufacturer of three manufacturers identified has a certificate for products other than milk. No information has been gathered regarding manufacturers of ultrasonic meters. The work group does not have a proposal to present at this time, but plans to continue its work. A new Chair is needed for the work group because Charlene Numrych (Liquid Controls) is no longer available to perform that function.

Decision: The Sector agreed that a work group to develop a family products table limited to only turbine meters should be formed. The members of the new work group are: Joe Buxton (Daniel Measurement & Control), Chair; Ray Kalivoda (FMC); Joseph Beyer (Liquid Controls); Gary Castro (California NTEP); and Christian Lachance (Measurement Canada).

The Sector also agreed to form a separate work group to develop a family products table for mag meters. The members of the Mag Meter work group are: Joseph Beyer (Liquid Controls), Chair; Wade Matar (Invensys/Foxboro); Christian Lachance (Measurement Canada); and Michael Keilty (Endress+Hauser).

6. Acceptable Symbols or Wording to Identify Unit Price, Total Price, and Quantity on a Retail Motor-Fuel Dispenser

Source: Maryland NTEP Laboratory

Background: At the June 2002 NTEP Laboratory Meeting, one of the participating laboratories requested guidance on acceptable symbols or wording to identify the unit price, total sale, and quantity delivered on a retail motor-fuel dispenser. The laboratories recommended the question be added to the 2002 Measuring Sector Agenda.

At the 2002 Sector Meeting, a work group was formed to address this issue. The Sector will consider the recommendations of that working.

No input has been received from the work group assigned to develop this issue following the 2002 Sector Meeting. If the Sector agrees, this item will be dropped from the agenda until a proposal is submitted for consideration.

Decision: The Sector agreed the work group should be disbanded and the NTEP Laboratories should develop a list of acceptable symbols at the next laboratory meeting. The Sector will review and consider the list of symbols at its 2005 meeting.

New Items:

7. Section E Meter Sizes to be Included on a Certificate of Conformance

Source: NTEP Director and NIST/WMD

Background: Section E states that "based upon the test of a meter (or meters) of only one size, meters one size larger and one size smaller than the meter that is tested and meeting the following criteria may be covered by the Certificate." In several cases Certificates of Conformance have been issued for a family of meter sizes where one meter size larger and/or one meter size smaller has been included above and/or below the largest and smallest meters that were actually tested. In some cases a manufacturer has asked to add an additional meter size to an existing CC where the "one size smaller or larger" has already been included and an additional larger or smaller meter, not on the existing CC, was submitted for evaluation.

Recommendation: The Sector is asked to determine if the current practice of adding additional sizes is acceptable and if Section E should be amended to provide criteria for adding additional sizes to a family of meter sizes based on meters tested.

Decision: The Sector agreed to forward the following amended Section E to the NTEP Committee for consideration.

E. Meter Sizes to be Included on a Certificate of Conformance

~~To cover a family of meters on a Certificate of Conformance, if there are more than three meter sizes in a family, the largest and smallest meters in the family shall be submitted for evaluation. It is suggested that these meters represent the meter with the lowest minimum rated flow and the meter with the highest rated flow rate. Depending upon the range between the largest and smallest meters, additional meters may be required to be submitted for testing.~~

Based upon the test of a meter (or meters) ~~of only one size~~, meters ~~one~~ ~~size~~ larger and ~~one~~ ~~size~~ smaller than the meter(s) ~~that~~ ~~is~~ tested and meeting the following criteria may be covered by the Certificate:

1. meter sizes with rated maximum flow rates of 50 % to 200 % of the rated maximum flow rate of the meter tested; and

2. meter sizes with rated minimum flow rates of 50 % to 200 % of the rated minimum flow rate of the meter tested.

The maximum flow rate achieved in an installation is considered to be 80 % of the maximum flow rate to be listed on the Certificate of Conformance.

8. Products to be covered on a Certificate of Conformance for a Meter Tested with Gasoline and/or Diesel Fuel

Source: NTEP Laboratories

Background: Several Certificates of Conformance have been issued with a statement in the application section that states that the Retail Motor-fuel Device (RFMD) is approved for dispensing all motor fuels based on the testing of gasoline and diesel fuel. In many cases the RMFDs have been used for dispensing blends of gasoline and oxygenates such as ethanol, methanol, or MTBE with no problems. More recently RMFDs have been used for blends of petroleum diesel fuel and vegetable oil referred to as Biodiesel. The product family tables in Publication 14 have family categories and subgroups for refined petroleum products, vegetable oils, and for alcohols; however, there is no family or subgroup for blended products. Most gasoline ethanol blends (gasohol) are a blend of approximately 90 % gasoline and 10 % ethanol. For methanol blends and MTBE the percentage of oxygenate is typically less than 5 %. Biodiesel is typically a blend of up to 20 % vegetable-based oil with petroleum-based diesel fuel. However, there are alcohol/gasoline blends available where the ratio is reversed, such as E85 and M85 which are comprised of 85 % alcohol and 15 % gasoline. The question from the laboratories is "at what point is a Certificate no longer applicable to a blended product?"

The Sector was asked to provide guidelines on testing required for adding products, such as alcohol blends up to 10 % or Biodiesel blends up to 20 % to an existing certificate for a meter tested with gasoline and/or diesel fuel. Additional subgroups for the product family tables may be required to provide guidance as to when devices must be reevaluated to include the higher ratios of blended alcohols or vegetable oils.

Decision: The Sector agreed to forward the following amended product family tables for positive displacement meters in NCWM Publication 14 to the NTEP Committee for consideration.

C. Product Families for Positive Displacement Meters

Product Family	Product Subgroup	Typical Products[1]	Viscosity (Centipoise)	Specific Gravity[2]	% Abrasive Solids
Fuel Lubricant, Oil Products and Edible Oil Products	Refined Products	Diesel Fuel, Distillate[3], Gasoline[3,4], Fuel Oil, Kerosene, Light Oil, Spindle Oil, Lubricating Oils, SAE Grades, Bunker Oil, 6 Oil, Crude Oil, Asphalt, Vegetable Oil, etc.	0.3 to 2500	0.68 to 1.1	None
	Aviation Fuels	AVgas, Jet A, Jet A-1, Jet B, JP4, JP5, JP7, JP8, etc.	0.4 to 3.6	0.68 to 0.85	None
	Vegetable Oils	Cooking Oils, Sunflower Oil, Soy Oil, Peanut Oil, Olive Oil, etc.	20 to 300	0.8 to 1.0	None
Solvents	Solvents General	Acetates, Acetone, Esters, Ethylacetate, Hexane, MEK, Naphtha, Toluene, Xylene, etc.	0.3 to 7	0.6 to 1.6	None
	Solvents Chlorinated	Carbon Tetra-Chloride, Methylene-Chloride, Perchloro-Ethylene, Trichloro-Ethylene, etc.	0.3 to 7	0.6 to 1.6	None
Alcohol & Glycols	Alcohols, Glycols, & Water Mixes Thereof	Ethanol, Methanol, Butanol, Isopropyl, Isobutyl, Ethylene glycol, Propylene glycol, etc.	0.3 to 7	0.6 to 1.6	None

Product Family	Product Subgroup	Typical Products[1]	Viscosity (Centipoise)	Specific Gravity[2]	% Abrasive Solids
Liquefied Compressed Gases	Fuels and Refrigerants	LPG,Propane, Butane, Ethane, Freon 11, Freon 12, Freon 22, etc.	0.1 to 0.5	0.3 to 0.65	None
	NH_3	Anhydrous Ammonia	0.1	0.56 to 0.68	None
Water	Water	Tap Water, Deionized, Demineralized, Potable	1.0	1.0	None
Agricultural Liquids	Clear Liquid				
	Fertilizers	Nitrogen Solution; 28 %, 30 % or 32 %; 20 % Aqua-Ammonia; Urea; Ammonia Nitrate; N-P-K solutions; 10-34-0; 4-10-10; 9-18-9; etc.	10 to 400	1.0 to 1.45	None
	Crop Chemicals	Herbicides: Round-up, Touchdown, Banvel, Treflan, Paraquat, Prowl, etc	4 to 400	0.7 to 1.2	None
		Fungicides, Insecticides, Adjuvants, Fumigants	0.7 to 100	0.7 to 1.2	None
	Flowables Crop Chemicals	Dual, Bicep, Marksman, Broadstrike, Doubleplay, Topnotch, Gaurdsman, Harness, etc.	20 to 900	1 t o1.2	Nil to 3 %
		Fungicides			
		Micronutrients			
	Suspensions				
	Fertilizers	3-10-30; 4-4-27, etc.	20 to 900	1.0 to 1.6	Nil to 4 %
	Liquid Feeds	Liquid Molasses; Molasses plus Phos Acid and/or Urea; etc.	10 to 50 000	1.2 to 1.5	Nil to 4 %
Chemicals	Chemicals	Sulfuric Acid, Hydrochloric Acid, Phosphoric Acid, etc	1.0 to 296	1.1 to 1.85	None

[1]*NOTE: The Typical Products listed in this table are not limiting or all-inclusive; there may be other products and product trade names, which fall into a product family and product subgroup.*

[2]The specific gravity of a liquid is the ratio of its density to that of water at standard conditions, usually 4 °C (or 20 °C) and 1 atm. The density of water at standard conditions is approximately 1000 kg/m3 (or 998 kg/m3)

[3] Diesel fuel blends (biodiesel) with up to 20 % vegetable or animal fat/oil.
[4] Gasoline includes oxygenated fuel blends with up to 15 % oxygenate.
Source for some of the viscosity value information is in the Industry Canada - Measurement Canada "Liquid Products Group, Bulletin V-16-E (rev. 1), August 3, 1999."

9. NTEP Tolerances for Meters with Different Flow Rates when Using Different Size Provers

Source: Maryland NTEP Laboratory

Background: During a recent evaluation of a high gallonage RMFD with marked flow rates of 60 gpm maximum and 12 gpm minimum, the Maryland NTEP laboratory found that the actual flow rate on the lowest setting of the automatic nozzle was 6 gpm. Several questions need to be addressed regarding this situation.

LMD Code paragraph N.4.2.2 (b) states **"**Devices marked with a flow-rate capacity of 100 L (25 gal) or more per minute, shall have a "special" test performed at the slowest of the following rates: (1) the minimum discharge rate marked on the device, or (2) the minimum discharge rate at which the device will deliver when equipped with an automatic discharge nozzle set at its slowest setting." Is it appropriate to operate the device below the marked minimum flow rate?

If a 10-gallon test measure is used, what is the appropriate tolerance applicable? LMD Code paragraph Table T.2. stipulates that the special test tolerance is 0.5 % or 11.55 cubic inches on a 10-gallon test draft; however, there is a footnote that states that the applicable acceptance tolerance when using a 10-gallon test draft is 5.5 cubic inches. Which tolerance should be applied during an NTEP evaluation? If a prover with a capacity greater than 10 gallons is used, does it provide a tolerance advantage over tests conducted with a 10-gal test measure?

General Code paragraph G-T.1. (e) states that acceptance tolerances apply to all equipment undergoing type evaluation. Does that mean that special test tolerances are not applicable during NTEP testing?

Recommendation: The Sector needs to determine what tolerances are appropriate for NTEP evaluations. The Sector may also want to recommend changes to Handbook 44 General Code G-T.1. and LMD Code paragraph N.4.2.2. and Table T2 as follows:

G-T.1. Acceptance Tolerances. - Acceptance tolerances shall apply to:

(a) equipment to be put into commercial use for the first time;

(b) equipment that has been placed in commercial service within the preceding 30 days and is being officially tested for the first time;

(c) equipment that has been returned to commercial service following official rejection for failure to conform to performance requirements and is being officially tested for the first time within 30 days after corrective service;

(d) equipment that is being officially tested for the first time within 30 days after major reconditioning or overhaul; and

(e) equipment undergoing type evaluation (special test tolerances are not applicable).

N.4.2.2. Retail Motor-Fuel Devices.

(a) Devices with a flow-rate capacity less than 100 L (25 gal) per minute shall have a "special" test performed at the slower of the following rates:

(1) 19 L (5 gal) per minute, or

(2) the minimum discharge rate marked on the device, or

(3) the minimum discharge rate at which the device will deliver when equipped with an automatic discharge nozzle set at its slowest setting provided it is not less than the marked minimum flow rate.

(b) Devices marked with a flow-rate capacity 100 L (25 gal) or more per minute shall have a "special" test performed at the slowest of the following rates:

(1) the minimum discharge rate marked on the device, or

(2) the minimum discharge rate at which the device will deliver when equipped with an automatic discharge nozzle set at its slowest setting provided it is not less than the marked minimum flow rate.

Table T.2. Accuracy Classes for Liquid Measuring Devices Covered in NIST Handbook 44 Section 3.30				
Accuracy Class	**Application**	**Acceptance Tolerance**	**Maintenance Tolerance**	**Special Test Tolerance**
0.3	**Petroleum products delivered from large-capacity motor-fuel devices (with marked maximum flow rates over 115 L/min (30 gpm))**, heated products at or greater than 50 °C, asphalt at or below temperatures 50 °C, all other liquids not shown where the typical delivery is over 200 L (50 gal).**	**0.2 %**	**0.3 %**	**0.5 %**
0.3A	**Asphalt at temperatures greater than 50 °C**	**0.3 %**	**0.3 %**	**0.5 %**
0.5*	**Petroleum products delivered from small-capacity (at designed maximum flow rates of 4 L/min (1 gpm) through 115 L/min (30 gpm))** motor-fuel devices, agri-chemical liquids, and all other applications not shown where the typical delivery is # 200 L (50 gal).**	**0.3 %**	**0.5 %**	**0.5 %**
1.1	**Petroleum products and other normal liquids from devices with flow rates** less than 1 gpm and devices designed to deliver less than one gallon.**	**0.75 %**	**1.0 %**	**1.25 %**
***For 5-gallon and 10-gallon test drafts, the tolerances specified for Accuracy Class 0.5 in the table above do not apply. For these test drafts, the maintenance tolerances on normal and special tests for 5-gallon and 10-gallon test drafts are 6 cubic inches and 11 cubic inches, respectively. Acceptance tolerances on normal and special tests are 3 cubic inches and 5.5 cubic inches. ** Flow rate refers to designed or marked maximum flow rate.**				

(Added 2002)

Decision: The Sector modified the recommendation as shown below and agreed to forward it to the NCWM and Southern Weights and Measures Association S&T Committees for consideration.

Recommendation: Modify Handbook 44 Section 1.10 paragraph G-T.1. Acceptance Tolerances (e) and Section 3.30. paragraph N.4.2.2. Retail Motor-Fuel Devices as follows:

G-T.1. Acceptance Tolerances. - Acceptance tolerances shall apply to:

(a) equipment to be put into commercial use for the first time;

(b) equipment that has been placed in commercial service within the preceding 30 days and is being officially tested for the first time;

(c) equipment that has been returned to commercial service following official rejection for failure to conform to performance requirements and is being officially tested for the first time within 30 days after corrective service;

(d) equipment that is being officially tested for the first time within 30 days after major reconditioning or overhaul; and

(e) equipment undergoing type evaluation (special test tolerances are not applicable).

N.4.2.2. Retail Motor-Fuel Devices.

(a) Devices with a flow-rate capacity less than ~~100~~ 115 L (~~25~~ 30 gal) per minute shall have a "special" test performed at the slower of the following rates:

(1) 19 L (5 gal) per minute, or

(2) the minimum discharge rate marked on the device, or

(3) the minimum discharge rate at which the device will deliver when equipped with an automatic discharge nozzle set at its slowest setting provided it is not less than the marked minimum flow rate.

(b) Devices marked with a flow-rate capacity ~~100~~ 115 L (~~25~~ 30 gal) or more per minute shall have a "special" test performed at the slowest of the following rates:

(1) the minimum discharge rate marked on the device, or

(2) the minimum discharge rate at which the device will deliver when equipped with an automatic discharge nozzle set at its slowest setting provided it is not less than the marked minimum flow rate.

10. Testing Required to Upgrade a RMFD from Audit Trail Category 2 to Category 3

Source: NTEP Director

Background/Discussion: Effective January 1, 2005, all devices with remote configuration capability must comply with the sealing requirements of Category 3. Several manufacturers have asked what level of testing is required to upgrade their Certificate of Conformance for a Category 2 device to cover a modification of their device to meet Category 3 requirements.

The Sector was asked to discuss the subject and provide input to the NTEP Committee regarding the amount of laboratory and/or field evaluation required to upgrade an existing certificate for a Category 2 device to cover an upgrade to Category 3.

Decision: The Sector agreed CC holders for liquid measuring devices with remote configuration capability that meet Category 2 sealing requirements must submit their device(s) for evaluation to verify the device meets Category 3 sealing requirements and have the CC upgraded. The Sector agreed to forward the following amended NCWM Publication Audit Trail Category Tables to the NTEP Committee for consideration.

Category 1 Devices (Devices with No Remote Configuration Capability):

The device is sealed with a physical seal or it has an audit trail with two event counters (one for calibration, the second for configuration).	**Yes ☐ No ☐ N/A ☐**
A physical seal must be applied without exposing electronics.	**Yes ☐ No ☐ N/A ☐**
Event counters are non-resettable and have a capacity of at least 000 to 999.	**Yes ☐ No ☐ N/A ☐**
Event counters increment appropriately.	**Yes ☐ No ☐ N/A ☐**
The audit trail information must be capable of being retained in memory for at least 30 days while the device is without power or must be retained in nonvolatile memory.	**Yes ☐ No ☐ N/A ☐**
Accessing the audit trail information for review shall be separate from the calibration mode.	**Yes ☐ No ☐ N/A ☐**
Accessing the audit trail information must not affect the normal operation of the device.	**Yes ☐ No ☐ N/A ☐**

Accessing the audit trail information shall not require removal of any additional parts other than normal requirements to inspect the integrity of a physical security seal. (e.g., a key to open a locked panel may be required). **Yes** ☐ **No** ☐ **N/A** ☐

Category 2 Devices (Devices with Remote Configuration Capability but Controlled by Hardware):

Category 2 applies only to devices manufactured prior to January 1, 2005. Devices with remote configuration capability manufactured after that date must meet the sealing requirements outlined in Category 3. Devices without remote configuration capability manufactured after that date will be required to meet the minimum criteria outlined in Category 1. ~~**Yes** ☐ **No** ☐ **N/A** ☐~~

~~**The physical hardware enabling access for remote communication must be on-site.**~~ ~~**Yes** ☐ **No** ☐ **N/A** ☐~~

~~**The physical hardware must be sealable with a security seal or**~~ ~~**Yes** ☐ **No** ☐ **N/A** ☐~~

~~**The device must be equipped with at least two event counters: one for calibration,**~~ ~~**Yes** ☐ **No** ☐ **N/A** ☐~~
~~**the second for configuration parameters**~~
- ~~**calibration parameters event counter**~~
- ~~**configuration parameters event counter**~~

~~**Adequate provision must be made to apply a physical seal without exposing electronics.**~~ ~~**Yes** ☐ **No** ☐ **N/A** ☐~~

~~**Event counters are nonresettable and have a capacity of at least 000 to 999.**~~ ~~**Yes** ☐ **No** ☐ **N/A** ☐~~

~~**Event counters increment appropriately.**~~ ~~**Yes** ☐ **No** ☐ **N/A** ☐~~

~~**Event counters may be located either:**~~ ~~**Yes** ☐ **No** ☐ **N/A** ☐~~
- ~~**at the individual measuring device or**~~
- ~~**at the system controller**~~

~~**If the counters are located at the system controller rather than at the individual device, means must be provided to generate a hard copy of the information through an on-site device.**~~ ~~**Yes** ☐ **No** ☐ **N/A** ☐~~

~~**An adequate number (see table below) of event counters must be available to monitor the calibration and configuration parameters of each individual device.**~~ ~~**Yes** ☐ **No** ☐ **N/A** ☐~~

~~**The device must either:**~~ ~~**Yes** ☐ **No** ☐ **N/A** ☐~~
- ~~**clearly indicate when it is in the remote configuration mode or**~~
- ~~**the device shall not operate while in the remote configuration mode.**~~

~~**If capable of printing in the calibration mode, it must print a message that it is in the calibration mode.**~~ ~~**Yes** ☐ **No** ☐ **N/A** ☐~~

~~**The audit trail information must be capable of being retained in memory for at least 30 days while the device is without power or must be retained in nonvolatile memory.**~~ ~~**Yes** ☐ **No** ☐ **N/A** ☐~~

~~**The audit trail information must be readily accessible and easily read.**~~ ~~**Yes** ☐ **No** ☐ **N/A** ☐~~

~~**Event counters located at the system controller must be provided with a means to generate a hard copy of the audit trail information.**~~ ~~**Yes** ☐ **No** ☐ **N/A** ☐~~

Category 3 Devices (Devices with Unlimited Remote Configuration Capability):

Category 3 devices have virtually unlimited access to sealable parameters or access is controlled though a password.

For devices manufactured after January 1, 2001, the device must either: **Yes ☐ No ☐ N/A ☐**
- **clearly indicate when it is in the remote configuration mode, or**
- **the device shall not operate while in the remote configuration mode**

The device is equipped with an event logger **Yes ☐ No ☐ N/A ☐**

The event logger automatically retains the identification of the parameter changed, the date and time of the change, and the new value of the parameter. **Yes ☐ No ☐ N/A ☐**

Event counters are nonresettable and have a capacity of at least 000 to 999. **Yes ☐ No ☐ N/A ☐**

The system is designed to attach a printer, which can print the contents of the audit trail. **Yes ☐ No ☐ N/A ☐**

The audit trail information must be capable of being retained in memory for at least 30 days while the device is without power or must be retained in nonvolatile memory. **Yes ☐ No ☐ N/A ☐**

The event logger must have a capacity to retain records equal to ten times the number of sealable parameters in the device, but not more than 1000 records are required. **Yes ☐ No ☐ N/A ☐**

The event logger drops the oldest event when the memory capacity is full and a new entry is saved. **Yes ☐ No ☐ N/A ☐**

Describe the method used to seal the device or access the audit trail information.

_____

_____

[NOTE: All devices with remote communication that are manufactured after January 1, 2005, must meet the requirements outlined for Category 3.]

~~Minimum Number of Counters Required~~		
	~~Minimum Counters Required for Devices Equipped with Event Counters~~	~~Minimum Event Counter(s) at System Controller~~
~~Only one type of parameter accessible (calibration or configuration)~~	~~One (1) event counter~~	~~One (1) event counter for each separately controlled device, or one (1) event counter, if changes are made simultaneously.~~
~~Both calibration and configuration parameters accessible~~	~~Two (2) event counters~~	~~Two (2) event counters for each separately controlled device, or two (2) or more event counters if changes are made to all controlled devices simultaneously.~~

11. Specific Gravity Range to be Covered on a Certificate of Conformance Based on Products Tested

Source: Invensys/Foxboro

Background: NCWM Publication 14 Section D. Product Family for Mass Flow Meters allows a Certificate of Conformance to cover only a range of specific gravities based on the products with the highest and lowest specific gravities tested. The specific gravity covered by a certificate can only be expanded by testing with additional products having a higher and/or lower specific gravity. The submitter believes the current limit on specific gravity range listed on

a certificate is too restrictive and would like to have the range of specific gravities covered on a certificate within ± 25 % (or at least a minimum of 10 %) from the highest and lowest specific gravities for products evaluated.

Recommendation: The Sector will consider the proposal, and if there is sufficient support, a work group should be formed to collect data to support expanding the range of densities covered on a certificate based on the densities of products tested. If the data collected provides evidence that the range can be expanded, the work group should provide a specific proposal for expanding the range by an appropriate percentage for the Sector to consider at its next meeting.

Decision: The Sector agreed to combine agenda Item 11 with agenda Item 13 for discussion.

12. Computer Jump on RMFD

Source: Maryland NTEP Laboratory

Background: As price for motor fuel nears or exceeds $2.00 per gallon, the number of complaints regarding computer jump has also increased. WMD has received numerous calls from jurisdictions related to this problem. It appears that the actual amount of jump or meter creep occurring because of internal pressure related to changes in temperature has not changed. However, at the higher unit prices this relatively small meter creep creates a delivery indication of several cents.

Recommendation: The Sector and the manufacturers of RMFDs may want to take a proactive role and develop a proposal for Handbook 44 to require that the measurement of product begins only after the system has reached normal delivery pressure. The Sector will review the following recommendation, and if it agrees, the recommendation will be forwarded to the NCWM S&T Committee for consideration.

S.1.6. Operating Requirements, Retail Devices (Except Slow Flow Meters).

S.1.6.1. Indication of Delivery. - The device shall automatically show on its face the initial zero condition and the quantity delivered (up to the nominal capacity).

~~However, the first 0.03 L (or 0.009 gal) of a delivery and its associated total sales price need not be indicated.~~

S.1.6.1.1. - The indication of delivered quantity and total price on a digital device shall be inhibited until the entire fuel delivery system reaches normal operating pressure.

(Amended 1982 and 200X)

Decision: The Sector amended the recommendation as shown below and agreed to forward it to the NCWM and Southern Weights and Measures Association S&T Committees for consideration.

Amend Handbook 44 Sec. 3.30. paragraph S.1.6.1. Indication of Delivery and add new paragraph S.1.6.1.1. Inhibiting Measurement and Indication of Delivery as follows:

S.1.6. Operating Requirements, Retail Devices (Except Slow Flow Meters).

S.1.6.1. Indication of Delivery. - The device shall automatically show on its face the initial zero condition and the quantity delivered (up to the nominal capacity).

However, the first 0.03 L (or 0.009 gal) of a delivery and its associated total sales price need not be indicated.

S.1.6.1.1. – After the suppression of up to 0.03 L (or 0.009 gal) the measurement of delivered quantity and indication of total price on a digital device shall be inhibited until the fueling position reaches normal delivery pressure.

(Amended 1982 and 200X)

13. Section D Product Family for Mass Flow Meters – Specific Gravity Range 0.1 Above and 0.1 Below Products Tested

Source: Endress & Hauser Flowtec AG

Background: Once tested with two liquids within a product group, a mass flow meter should be covered for liquids with specific gravities of 0.1 above and 0.1 below the range of specific gravities for the liquid(s) tested.

Recommendation: Add additional language to Section D, Page LMD 4 of Publication 14, 2004 edition as follows:

D. Product Families for Mass Flow Meters

When submitting a direct mass flow meter for evaluation, the manufacturer must specify the product or product group for which the meter is being submitted. To cover a product group, NTEP tests must be conducted with two liquids within the product group. Upon test completion, a range of specific gravities between the specific gravities of the two liquids attained within the product group will be covered on the Certificate of Conformance (CC). The mass flow meter will be covered for approved liquids with density 0.1 above the highest specific gravity tested and 0.1 below the lowest specific gravity tested. The specific gravity range within the product group can be expanded by conducting an NTEP test with a liquid of higher or lower specific gravity than is covered on the existing CC.

The above does not apply to the following product groups: compressed gases, compressed liquids, and cryogenic liquids. In the case of these product groups, only one liquid within each group is required to undergo an NTEP evaluation, and, upon completion, the entire product group will be covered on the existing CC.

Multi-product applications (i.e., applications in which the meter will be used without a change to zero or calibration to dispense different products which vary in specific gravity by more than 0.1) must include a multi-product test. The multi-product initial test will be performed on the meter without a change to zero or calibration using multiple products having a difference in specific gravity of at least 0.2. For devices which will be used to dispense multiple products having a specific gravity range greater than 0.2, the multi-product testing must be performed over the anticipated range before multi-product applications will be included on the CC. For the multi-product testing, throughput testing will be performed on one or a combination of the products; testing for the subsequent test will be conducted on both products without a change to zero or calibration. Multi-product testing requirements do not apply to meters used to dispense a product such as propane in which the density varies in normal operation.

Decision: The Sector agreed to forward the following amended first paragraph Section D of NCWM Publication 14 for Liquid Measuring Devices to the NTEP Committee for consideration.

D. Product Families for Mass Flow Meters

When submitting a direct mass flow meter for evaluation, the manufacturer must specify the product or product group for which the meter is being submitted. To cover a product group, NTEP tests must be conducted with two liquids within the product group. ~~Upon test completion, a range of specific gravities between the specific gravities of the two liquids attained within the product group will be covered on the Certificate of Conformance (CC).~~ When two liquids of different densities are tested the Certificate of Conformance (CC) for the mass flow meter will cover approved liquids with a specific gravity range from 0.1 above the highest specific gravity tested to 0.1 below the lowest specific gravity tested. The specific gravity range within the product group can be expanded by conducting an NTEP test with a liquid of higher or lower specific gravity than is covered on the existing CC.

The above does not apply to the following product groups: compressed gases, compressed liquids, and cryogenic liquids. In the case of these product groups, only one liquid within each group is required to undergo an NTEP evaluation, and, upon completion, the entire product group will be covered on the existing CC.

Multi-product applications (i.e., applications in which the meter will be used without a change to zero or calibration to dispense different products which vary in specific gravity by more than 0.1) must include a multi-product test. The multi-product initial test will be performed on the meter without a change to zero or calibration using multiple products having a difference in specific gravity of at least 0.2. For devices which will be used to dispense multiple products having a specific gravity range greater than 0.2, the multi-product testing must be performed over the anticipated range before multi-product applications will be included on the CC. For the multi-product testing, throughput testing will be performed on one or a combination of the products; testing for the subsequent test will be conducted on both products without a change to zero or calibration. Multi-product testing requirements do not apply to meters used to dispense a product such as propane in which the density varies in normal operation.

14. Section D Product Family for Mass Flow Meters – Multi-product Applications

Source: Endress & Hauser Flowtec AG

Background: A mass flow meter submitted and approved for multi-product testing where product densities differ by greater than 0.2 has demonstrated ability to perform with major density changes. Therefore, the mass flow meter should be able to be used for products with differing densities throughout the range of the meter approval.

Recommendation: Add additional language to Section D, Page LMD 4 of Publication 14, 2004 edition as follows:

D. Product Families for Mass Flow Meters

When submitting a direct mass flow meter for evaluation, the manufacturer must specify the product or product group for which the meter is being submitted. To cover a product group, NTEP tests must be conducted with two liquids within the product group. Upon test completion, a range of specific gravities between the specific gravities of the two liquids attained within the product group will be covered on the Certificate of Conformance (CC). The specific gravity range within the product group can be expanded by conducting an NTEP test with a liquid of higher or lower specific gravity than is covered on the existing CC.

The above does not apply to the following product groups: compressed gases, compressed liquids, and cryogenic liquids. In the case of these product groups, only one liquid within each group is required to undergo an NTEP evaluation and, upon completion, the entire product group will be covered on the existing CC.

Multi-product applications (i.e., applications in which the meter will be used without a change to zero or calibration to dispense different products which vary in specific gravity by more than 0.1) must include a multi-product test. The multi-product initial test will be performed on the meter without a change to zero or calibration using multiple products having a difference in specific gravity of at least 0.2. For devices which will be used to dispense multiple products having a specific gravity range greater than 0.2, the multi-product testing must be performed over the anticipated range before multi-product applications will be included on the CC. For the multi-product testing, throughput testing will be performed on one or a combination of the products; testing for the subsequent test will be conducted on both products without a change to zero or calibration. <u>The mass flow meter will be approved for multi-product applications where the specific gravity of a single product, or multiple products, varies by the amount tested throughout the entire approved specific gravity range of the meter. Example: Where a meter has been tested and a certificate issued for multi-product applications with one liquid having a specific gravity of 0.7 and another liquid having a specific gravity of 1.0 and the meter is subsequently tested to expand the range with a liquid having a specific gravity of 1.6 the allowed variation of densities will be from 0.7 through 1.6.</u> Multi-product testing requirements do not apply to meters used to dispense a product such as propane in which the density varies in normal operation.

Decision: The Sector agreed to forward the following amended last paragraph of Section D in NCWM Publication 14 for Liquid Measuring Devices to the NTEP Committee for consideration.

D. Product Families for Mass Flow Meters

When submitting a direct mass flow meter for evaluation, the manufacturer must specify the product or product group for which the meter is being submitted. To cover a product group, NTEP tests must be conducted with two liquids within the product group. Upon test completion, a range of specific gravities between the specific gravities of the two liquids attained within the product group will be covered on the Certificate of Conformance (CC). The specific gravity range within the product group can be expanded by conducting an NTEP test with a liquid of higher or lower specific gravity than is covered on the existing CC.

The above does not apply to the following product groups: compressed gases, compressed liquids, and cryogenic liquids. In the case of these product groups, only one liquid within each group is required to undergo an NTEP evaluation and, upon completion, the entire product group will be covered on the existing CC.

Multi-product applications (i.e., applications in which the meter will be used without a change to zero or calibration to dispense different products which vary in specific gravity by more than 0.1) must include a multi-product test. The multi-product initial test will be performed on the meter without a change to zero or calibration using multiple products having a difference in specific gravity of at least 0.2. For devices which will be used to dispense multiple products having a specific gravity range greater than 0.2, the multi-product testing must be performed over the anticipated range before multi-product applications will be included on the CC. For the multi-product testing, throughput testing will be performed on one or a combination of the products; testing for the subsequent test will be conducted on both products without a change to zero or calibration. The CC for a mass flow meter will cover multi-product applications where the specific gravity of a single product, or multiple products, varies by the amount tested throughout the entire approved specific gravity range of the meter. Example: Where a meter has been tested and a certificate issued for multi-product with one liquid having a specific gravity of 0.7 and another liquid having a specific gravity of 1.0 and the meter is subsequently tested to expand the range with a liquid having a specific gravity of 1.6 the allowed variation of densities covered by the CC will be from 0.7 through 1.6. Multi-product testing requirements do not apply to meters used to dispense a product such as propane in which the density varies in normal operation.

15. Next Meeting

The Sector discussed the time and location for its next meeting.

Decision: The Sector agreed to recommend to the NCWM NTEP Committee that the 2005 Measuring Sector Meeting be held immediately prior to the 2005 meeting of the Southern Weights and Measures Association beginning at 8:00 am on Friday and continuing through 5:00 pm on Saturday. The ending time on Saturday will be dependent on the length of the agenda.

Additional Items

16. ECRs Approved for Dispensers from Multiple Manufacturers

Source/Background: The NTEP Laboratories want to know how many dispensers and features should be evaluated in the laboratory and/or field when evaluating an ECR for use with multiple dispensers,

Decision: The Sector agreed that, as a minimum, two dispensers from different manufacturers, each of which includes all of the features listed on the ECR CC, must be evaluated with the ECR in order to have the statement "equivalent and compatible equipment" appear on the CC. The Sector further agreed to forward to the NTEP Committee for consideration the following amendment to NCWM Publication 14 Section A of the Electronic Cash Register Interfaced with Retail Motor-Fuel Dispensers.

A. Introduction

This checklist is intended for use when conducting general evaluations of new electronic cash registers that are to interface with retail motor-fuel dispensers. It is assumed that the dispenser was previously evaluated, if not, the LMD checklist must be applied to the dispenser sale system. The ECR must interface with a dispenser to perform this evaluation. Specific criteria that apply to service station control consoles are in the checklist for retail motor-fuel dispensers and must be applied if the cash register also serves as the service station controller. As a minimum, two dispensers from different manufacturers, each of which includes all of the features to be listed on the ECR CC, must be evaluated with the ECR in order to have the statement "equivalent and compatible equipment" appear on the CC.

This checklist is designed in a logical sequence for the user to determine and record the conformance of the device with the elements of NIST Handbook 44. The user should make copies of the checklist to serve as worksheets and preserve the original for reference. In most cases, the results of evaluation for each element can be recorded by checking the appropriate response to the following:

17. Zero Set-back Interlocks on Vehicle-tank Meters

Source/Background: The S&T Committee has requested input from the Sector on Carryover Item 331-3, a Handbook 44 requirement for Zero Set-back Interlocks on Vehicle-tank Meters.

Decision: The Sector agreed to forward the following new paragraph S.2.4. for Handbook 44 Section 3.31. Vehicle-Tank Meters to the SWMA and NCWM S&T Committees for consideration.

S.2.4. Zero-Set-Back Interlock, Vehicle-Tank Meters. – Except for aircraft fueling, an electronic device shall be so constructed that after an individual or multiple deliveries at one location have been completed, an automatic interlock system shall engage to prevent a subsequent delivery until the indicating and, if equipped, recording elements have been returned to their zero position. For individual deliveries, if there is no product flow for 3 minutes the transaction must be completed before additional product flow is allowed. The 3 minute timeout may be a sealable feature on an indicator designed for commercial and non-commercial applications.
[Nonretroactive as of January 1, 200X]

18. Wireless Communication Systems

Source/Background: The Maryland NTEP Laboratory has a fuel dealer that wants to install a wireless communication system for transferring billing information from the vehicle-tank meter to a central billing office. Does the communication equipment installed for this purpose require an NTEP CC?

Decision: The Sector agreed that the scenario as described, where wireless communication is used to transfer billing information, is not an NTEP issue at this time. The scenario is similar in some respects systems that use telephone communication to transfer billing information to a central billing office. NTEP currently evaluates systems to the point of the first final indication of quantity delivered.

19. Display of Unit Price on Vehicle-Tank Meters

Source/Background: Maryland NTEP Laboratory and FMC requested clarification of the intent of Handbook 44 Section 3.31., paragraph S.1.4.1. The paragraph states that a device of the computing type shall provide a means to display the unit price at which the device is set to compute on the outside of the device.

Can the unit price be on the display screen?
If it is on the display screen, is it required to be displayed full time?
Does a posted sign plaque meet the requirement?

Decision: The Sector agreed to forward the following amended paragraph S.1.4.1. to the SWMA and NCWM S&T Committees for consideration.

S.1.4.1. Display of Unit Price. - In a device of the computing type, means shall be provided for displaying ~~on the outside of the device~~, in a manner clear to the operator and an observer, the unit price at which the device is set to compute. <u>The unit price is not required to be displayed continuously.</u>

20. Evaluations Using Simulated Input Devices

Source/Background: FMC Measurement Solutions requested the Sector provide guidelines for evaluating electronic indicating devices when submitted separate from the measuring element. Will NTEP allow electronic indicators to be evaluated using simulated inputs, i.e., meter pulse, temperature, pressure density etc?

Decision: The Sector agreed to forward to the NTEP Committee for consideration the following new Section U for addition to the Technical Policy for Liquid-Measuring Devices in Publication 14.

U. Testing Electronic Indicators for Stationary Installations Using Simulated Inputs.

When evaluating electronic indicators for stationary installations, submitted separate from a measuring element, indicators may be evaluated using simulated inputs (i.e., meter pulse, temperature, pressure, density, etc.).

21. Modifications to Pre-NTEP Certificates:

Source/Background: FMC Measurement Solutions requested the Sector provide guidelines for allowing feature modifications to pre-NTEP certificates without the need for permanence testing for established metering technologies, i.e., PD meters, if the modification can be shown that the measurement basis has not been changed (no metrological significance).

Example of feature modification: Changing a PD meter with a conventional shaft output to a direct electronic output. Cyclic volume remains unchanged as the modification is (1) the replacement of the top cover to remove the gear train and packing glands and (2) the addition of a target gear and electronic sensor(s). The measurement chamber (cyclic volume) remains unchanged.

Decision: The Sector agreed that changing from a conventional shaft output to an electronic output with the removal of a gear train, the external shaft, and packing gland, along with the addition of a target gear and electronic sensor(s), is a modification of type that requires, as a minimum, an initial evaluation of the modified device. Permanence testing may be required at the discretion NTEP based on the results of the initial evaluation.

Attendance List

Name	Company/Agency	Address	Telephone #	E-Mail Address
Belue, Mike	Belue Associates	1319 Knight Dr Murfreesboro TN 37128	615 867 1010	bassoc@aol.com
Beyer, Joseph	Liquid Controls	105 Albrecht Drive Lake Bluff, IL 60044	847 283 8300	jbeyer@idexcorp.com
Butler, Jerry	North Carolina Dept of Agriculture	1050 Mail Service Center Raleigh, NC 27699-1050	919 733 3313	Jerry.butler@ncmail.net
Buxton, Joe	Daniel Measurement Control	19267 Hwy 301 N Statesboro, GA 30461	912 489 0253	Joe.buxton@emersonprocess.com
Castro, Gary	State of California Meas Stds	8500 Fruitridge Rd Sacramento CA 95826	916 229 3049	gcastro@cdfa.ca.gov
Cooper, Rodney	Actaris Neptune	1310 Emerald Rd Greenwood SC 29646	864 942 2226	rcooper@greenwood.actaris.com
Forkert, Maurice	Tuthill Transfer Systems	8825 Aviation Dr Ft Wayne IN 46809	260 747 7529	mforkert@Tuthill.com
Gallo, Mike	Clean Fuel Technologies	140 Market Street Georgetown, TX 78626	512 942-8304	Mike.gallo@cftdispensers.com
Glowacki, Paul	Murray Equipment, Inc.	2515 Charleston Place Fort Wayne, IN 46808	260 484 0382	pglowacki@murrayequipment.com
Hoffman, David	Toptech Systems	280 Hunt Park Cove Longwood FL 32750	407 332 1774	dhoffman@toptech.com
Johnson, Gordon	Marconi Commerce Systems Inc	7300 W Friendly Ave Greensboro NC 27420	336 547 5375	gordon.johnson@marconi.com
Kalevoda, Raymond	FMC Measurement Solutions	1602 Wagner Avenue Erie, PA 16510	814 898 5264	Ray.kalivoda@fmcti.com
Katalinic, Allen	North Carolina Dept of Agriculture	1050 Mail Service Center Raleigh, NC 27699-1050	919 733 3313	
Katselnik, Yefim	Dresser Wayne	3814 Jarrett Way Austin, TX 78728	512 388 8763	Phil.katselnik@wayne.com
Keilty, Mike	Endress & Hauser Flowtech AG	2350 Endress Place Greenwood, IN 46143	317 535 2745	Michael.keilty@us.endress.com
Kingbury, Ted	Measurement Canada	Stds Bldg #4 Tunney's Pasture Ottawa Ontario K1AOC9	613 941 8919	Kingsbury.ted@ic.gc.ca
Kretzler, Randal	Dresser Wayne/Dresser, Inc.	3814 Jarrett Way Austin, TX 78728-1212	512 388 8420	Randal.kretzler@wayne.com
Lachance, Christian	Measurement Canada	Stds Bldg #4 Tunney's Pasture Ottawa Ontario K1AOC9	613 952 3528	Lachance.Christian@ic.gc.ca
Long, Douglas	RDM Industrial Electronics	850 Harmony Grove Rd Nebo, NC 28761	828 652 8346	doug@wnclink.com
Mattar, Wade	Invensys/Foxboro	33 Commercial Street PO Box 10428 Erie, PA 16514	508 549 2067	wmattar@foxboro.com
Miller, Richard	FMC Measurement Solutions	1602 Wagner Ave, Box 10428 Erie, PA 16514	814 898 5214	rich.miller@fmcti.com
Onwiler, Don	Nebraska Div of Weights & Meas	301 Centennial Mall South PO Box 94757 Lincoln, NE 68509	402 471 4292	donlo@agr.state.ne.us
Parrish, Johnny	Brodie Meter Co., LLC	19267 Highway 301 North Statesboro, GA 30461	912 489 0203	Johnny.parrish@brodiemeter.com
Patoray, Steve	NTEP/NCWM	1239 Carolina Dr Tryon NC 28782	828 859 6178	spatoray@mgmtsol.com
Rajala, David	Veder-Root Company	P.O. Box 1673 Altoona, PA 19906-1673	814 696 8125	drajala@veeder.com
Suiter, Richard	NIST/OWM	Stop 2600 100 Bureau Dr Gaithersburg MD 20878	301 975 4406	rsuiter@nist.gov
Wotthlie, Richard	State of Maryland	50 Harry S. Truman Parkway Annapolis MD 21771	410 841 5790	wotthlrw@mda.state.md.us

Appendix D

National Type Evaluation Technical Committee
Weighing Sector Meeting – Annual Meeting

August 29-31 2004, Ottawa Canada
Draft Summary of Decisions

Carry-Over Items

1. Recommended Changes to Publication 14 Based on Actions at the 2004 NCWM Annual Meeting

The NTEP technical advisor provided the Sector with specific recommendations for incorporating into Publication 14 test procedures and checklist language based upon actions of the previous Annual Meeting of the NCWM. The Sector was asked to briefly discuss each item and provide general input on the technical aspects of the issues.

(a). Manual Gross Weight Entries

Background: See the Report of the 89th National Conference on Weights and Measures, Specifications and Tolerances Committee Agenda Item 320-1for additional background information. During its 2004 Annual Meeting, the NCWM agreed to amend NIST Handbook 44 2.20. Scales Code paragraph S.1.12. Manual Gross Weights to allow the manual entry of net weights for prepackage applications and for pre-weighed items from other legal-for-trade scales.

Discussion: The Weighing Sector considered a proposal from the NIST technical advisor to amend NCWM Publication 14 Weighing Devices Technical Policy, Checklists, Test Procedures Digital Electronic Scales Section 17 Manual Weight Entries.

During the discussion, confusion arose regarding identifying preset tare weights (i.e., keyboard tare entry or tare stored in memory) as manual weight entries, and this confusion may be attributed to the adopted amended title of the amended paragraph S.1.12 "Manual Weights." One commenter was concerned that two manual weights may have to be entered for weigh-in/weigh-out transactions when there is a loss of communication between separate weighing locations and that the manual tare weight entries should be identified. Another commenter suggested additional language for paragraph S.1.12 that would state that preset tares do not have to be identified. The NIST technical advisor reported the intent of the proposed amendment to S.1.12 did not apply to preset tare weights and that amending the title of paragraph S.1.12. to Manual Gross or Net Weight Entries (did what--solved the problem?).

Additionally, the Sector made some editorial suggestions to the proposed amendment to Publication 14 Section 17.

Recommendation: **The Sector recommends that amendments proposed in Appendix A agenda Item 1(a) be incorporated into Publication 14 Section 17. Manual Weights.**

Additionally, the Weighing Sector suggested that the S&T technical advisors make the following editorial changes to paragraph S.1.12. of NIST Handbook 44, indicated in underlined text, to clarify that the amended paragraphs do not apply to manually entered tare weights, and that manual net weight entries are non-retroactive as of January 1, 2005:

> ***S.1.12. Manual Gross or Net Weight Entries. -*** *A device when being used for direct sale shall accept an entry of a manual gross or net weight value only when the scale gross or net[2] weight indication is at zero. Recorded manual weight entries, except those on labels generated for packages of standard weights, shall identify the weight value as a manual weight entry by one of the following terms: "Manual Weight," "Manual Wt," or "MAN WT." The use of a symbol to identify multiple manual weight entries on a single document is permitted, provided that the symbol is defined on the same page on which the manual weight entries appear and the definition of the symbol is automatically printed by the recording element as part of the document.*
> *[Nonretroactive as of January 1, 1993]*
> *[Nonretroactive as of January 1, 2005[2]]*
> *(Added 1992) (Amended 2004[2])*
>
> [2] *The term "net" was added in 2004 to include net weights entered from items pre-weighed on a legal-for-trade scale.*

(b). Section Capacity Prefix

Background: See the Report of the 89th National Conference on Weights and Measures, Specifications and Tolerances Committee Agenda Item 320-3 for additional background information. During its 2004 Annual Meeting, the NCWM

agreed to amend NIST Handbook 44 2.20. Scales Code paragraph S.6.4.3. Section Capacity Prefix and Table S.6.3.a. Marking Requirements. During its 2004 Annual Meeting, the NCWM agreed to additional language for the 2005 Edition of NIST Handbook 44 regarding the use of abbreviations for the marking of section capacity.

Discussion/Recommendation: **The Weighing Sector considered a proposal from the NIST technical advisor to amend NCWM Publication 14 Weighing Devices Technical Policy, Checklists, Test Procedures Digital Electronic Scales Section 5. Marking – Livestock, Vehicle, and Railway Track Scales paragraph 5.1. and agreed to recommend that amendments proposed in Appendix A, agenda Item 1(b) be incorporated into Publication 14 Section 5.**

(c). Field Standard Weight Cart

Background: See the Report of the 89th National Conference on Weights and Measures, Specifications and Tolerances Committee Agenda Item 320-4 for additional background information to amend NIST Handbook 44 2.20. Scales Code paragraph Item 320-4 N.3.2. Field Standard Weight Carts. During its 2004 Annual Meeting, the NCWM agreed to add language in the 2005 Edition of NIST Handbook 44 recognizing field standard weight carts for use as a certified test load.

Discussion/Recommendation: **The Weighing Sector recommends no further action on this item.**

(d). Discrimination Test

Background: See the Report of the 89th National Conference on Weights and Measures, Specifications and Tolerances Committee Agenda Item 320-5 for additional background information. During its 2004 Annual Meeting, the NCWM agreed to amend NIST Handbook 44 2.20. Scales Code paragraph N.1.5 Discrimination Test to add language to the 2005 Edition of NIST Handbook 44 to clarify discrimination test procedures for testing scales with an operational automatic zero-setting mechanism.

Discussion: NCWM Publication 14 already includes procedures to conduct discrimination tests near zero and near capacity. The Sector considered a proposal by the NIST technical advisor to amend Publication 14, Digital Electronic Scales Sections 63 "Performance and Permanence Test for Floor Scales" and 69 "Performance and Permanence Test for Dynamic Monorail Scales." The Sector discussed that Publication 14 Section 43 "Zone of Uncertainty" should also include test procedures for determining compliance with discrimination test requirements that are similar to requirements and tests recommended by Measurement Canada and OIML R76 for Non-automatic Weighing instruments.

Recommendation: **The Weighing Sector recommends that NCWM Publication 14 Sections 43 Zone of Uncertainty, 63 Performance and Permanence Test for Floor Scales, and 69 Performance and Permanence Test for Dynamic Monorail Scales" be amended to clarify discrimination test requirements and procedures as shown in Appendix A, agenda Item 1 (d).**

(e). Automatic Weighing Systems

Background: See the Report of the 89th National Conference on Weights and Measures, Specifications and Tolerances Committee Agenda Item 324-1 for additional background information. During its 2004 Annual Meeting, the NCWM agreed to change the status of Handbook 44, Section 2.24. Automatic Weighing Systems (AWS) from a tentative code to a permanent code. One of the changes to the tentative code was to remove the type evaluation test procedures and incorporate them into NCWM Publication 14.

Discussion/Recommendation: **The Weighing Sector reviewed the proposed language, as shown in Appendix A agenda Item 1(e), which was developed by Andrea Buie of the Maryland NTEP laboratory, and recommended that such language be added to Publication 14 Automatic Weighing Systems checklist. The Sector also recommended that a meeting should be planned to develop additional changes to Publication 14 that were identified during the 2002 meeting of the AWS NCWM Work Group. The Sector further believes that much of the work can be accomplished electronically among the participants following the next meeting.**

2. Identification: Built-for-Purpose Software-based Devices

Background: See the Report of the 89th National Conference on Weights and Measures, Specifications and Tolerances Committee Agenda Item 320-1for additional background information and the proposed language considered by the S&T Committee.

At the 2004 NCWM Interim Meeting, the S&T Committee requested that prior to the NCWM Annual Meeting in July 2004 the technical advisor to the NTETC Weighing Sector distribute to its members the proposal for the S&T Committee's Agenda Item 310-1 along with a ballot requesting support for the proposal. Although there were 15 responses to the ballot and the majority of the members of the Weighing Sector voted affirmatively, there was no clear consensus.

At the 2004 NCWM Annual Meeting, the Scale Manufacturers Association (SMA) stated that Item 310-1 should not go forward for a vote because the ballot of the NTETC Weighing Sector failed to provide clear support for the item. A manufacturer stated that the term "microprocessor" was not appropriate because their devices contain numerous microprocessors. Another manufacturer stated that the requirement for marking the current software version number would place an unrealistic burden on their company. The Committee agreed that sufficient opposition and questions were raised during the open hearing to demonstrate that the item is not sufficiently developed to be a voting item at this meeting. The Committee agreed to make Item 310-1 an information item to be returned to the NTETC Weighing and Measuring Sectors for further development.

Discussion: The Weighing Sector reviewed the background information from the NCWM S&T Committee, previous Sector recommendations, and information regarding international activities. The Sector also reviewed an updated proposal for S&T agenda Item 310-1 from NIST WMD. The updated proposal included new and amended definitions and attempted to address concerns raised during the NCWM S&T Committee and open hearing deliberations on this item. The definition for "not-built-for-purpose" devices was amended to clarify their use as auxiliary or peripheral equipment for weighing and measuring devices and systems.

Some of the private Sector members repeated their comments that current electronic weighing and measuring equipment technology easily permits the display of required identification information and that there was no technical justification for treating these devices differently than not-built-for-purpose devices.

Additionally, the proposed definitions would reclassify most measuring devices according to the physical property being measured (e.g., liquid, length, vapor, cryogenic, etc.). Since the proposed new definition for measuring devices applies to all types of Handbook 44 devices, there was some concern that laws and regulations would need changing because many states' statutes are written using the "weighing and measuring" device terminology.

Recommendation: **The Sector recommended the following updated proposal submitted by NIST WMD with suggestions from the Weighing Sector be forwarded to the NTETC Measuring Sector for its review and comments.**

Add new Terms and definitions as follows:

measuring device (general) – A device (instrument) intended to be used to make measurements, alone or in conjunction with supplementary devices. (VIM)

measuring system (general) - An instrument or group of instruments that serves to make measurements, alone or in conjunction with supplementary devices. (VIM)

electronic devices – A device operating by the principles of electronics, which may consist of one or more subassemblies and performs a specific function(s). (ASTM)

not-built-for-purpose device -- Any electronic peripheral or auxiliary device or element which was not originally manufactured with the intent that it be used as, or part of, a weighing or measuring device or system.

metrological software version (revision) – A designation that specifically defines the metrological software version used in a measuring instrument, system, or peripheral/auxiliary device with field programmable or downloadable metrological software).

weighing device (instrument) -- A measuring instrument that serves to determine the mass of a body by using the action of gravity on said body. The instrument may also be used to determine other quantities, magnitudes, parameters or characteristics related to the determined mass. According to its method of operation, a weighing instrument is classified as an automatic or non-automatic instrument. (OIML R76)

Amend the definition for built-for-purpose device as follows:

built-for-purpose device – Any main, peripheral, or auxiliary device or element which was manufactured with the intent that it be used as, or part of, a ~~weighing or~~ measuring device or system.

Amend General Code paragraph G-A.1. Commercial and Law Enforcement Equipment as follows:

G-A.1. Commercial and Law Enforcement Equipment. - These specifications, tolerances, and other technical requirements apply as follows:

(a) To commercial ~~weighing and~~ measuring devices or systems ~~equipment~~; that is, to weights, ~~and~~ measures, and ~~weighing and~~ measuring devices or systems commercially used or employed in establishing the ~~size,~~ quantity, ~~extent, area,~~ or measurement of quantities, ~~things, produce, or articles for~~ distributed or consumed, purchased, offered, or submitted for sale, hire, or award, or in computing any basic charge or payment for services rendered on the basis of quantity determination ~~weight or measure~~.

(b) To any accessory attached to or used in connection with a commercial ~~weighing or~~ measuring device when such accessory is so designed that its operation affects the accuracy of the device.

~~(c) To~~ weighing and ~~measuring~~ devices or systems ~~equipment in official use for the enforcement of law or for the collection of statistical information by government agencies.~~

(These requirements should be used as a guide by the weights and measures official when, upon request, courtesy examinations of noncommercial equipment are made.)

Amend General Code paragraph G-S.1. Identification as follows:

G-S.1. Identification. - All equipment, except weights and separate parts necessary to the measurement process, but not having any metrological effect, shall be clearly marked in accordance with Table G-S.1. for the purposes of identification, with the following information:

(a) the name, initials, or trademark of the manufacturer or distributor;

(b) a model designation that positively identifies the pattern, ~~or~~ design, or metrological version or revision of the device in accordance with Table G-S.1;

(c) the model designation shall be prefaced by the term "Model," "Type," or "Pattern." These terms may be followed by the term "Number" or an abbreviation of that word. The abbreviation for the word "Number" shall, as a minimum, begin with the letter "N" (e.g., No or No.). The abbreviation for the word "Model" shall be "Mod" or "Mod."

[Nonretroactive January 1, 2003]
(Added 2000) (Amended 2001)

[Note: Prefix lettering may be initial capitals, all capitals or all lower case.]

(d) except for equipment with no moving or electronic component parts and not-built-for-purpose, ~~software-based~~ electronic devices, a nonrepetitive serial number;
[Nonretroactive as of January 1, 1968]

~~(e) for not-built-for-purpose, software-microprocessor-based devices the current software version designation or revision number;~~
~~(Added 2003)~~

(ef) the serial number shall be prefaced by words, an abbreviation, or a symbol that clearly identifies the number as the required serial number; and
[Nonretroactive as of January 1, 1986]

(fg) the serial number shall be prefaced by the words "Serial Number" or an abbreviation of that term. Abbreviations for the word "Serial" shall, as a minimum, begin with the letter "S," and abbreviations for the word "Number" shall, as a minimum, begin with the letter "N" (e.g., S/N, SN, Ser. No, and S No.).
[Nonretroactive as of January 1, 2001]

(gh) ~~F~~for devices that have an NTEP Certificate of Conformance (CC), the CC Number or a corresponding CC addendum number ~~shall be~~ prefaced by the terms "NTEP CC," "CC," or "Approval." These terms may be followed by the term "Number" or an abbreviation of that word. The abbreviation for the word "Number" shall, as a minimum, begin with the letter "N" (e.g., No or No.).
[Nonretroactive as of January 1, 2003]

The required information shall be so located that it is readily observable without the necessity of the disassembly of a part requiring the use of any means separate from the device.
(Amended 1985, 1991, 1999, 2000, 2001 and 2003)

Delete General Code paragraph G-S.1.1. Location of Marking Information for Not-Built-for-Purpose, Software-based Devices and renumber G-S.1.2. Remanufactured Devices and Remanufactured Main Elements as follows:

G-S.1.1. Location of Marking Information for Not-Built-for-Purpose, Software-based Devices. - For not-built-for-purpose, software-based devices, the following shall apply:

~~*(a) the manufacturer or distributor and the model designation shall be continuously displayed or marked on the device (see note below), or*~~

~~*(b) the Certificate of Conformance (CC) Number shall be continuously displayed or marked on the device (see note below), or*~~

~~*(c) all required information in G-S.1. Identification. (a), (b), (c), (e), and (h) shall be continuously displayed. Alternatively, a clearly identified "view only" System Identification, G-S.1. Identification, or Weights and Measures Identification shall be accessible through the "Help" menu. Required information includes that information necessary to identify that the software in the device is the same type that was evaluated.*~~

~~*Note: Clear instructions for accessing the remaining required G-S.1. information shall be listed on the CC. Required information includes that information necessary to identify that the software in the device is the same type that was evaluated.*~~
~~*[Nonretroactive as of January 1, 2004]*~~
~~**(Added 2003)**~~

G-S.1.1~~2~~. Remanufactured Devices and Remanufactured Main Elements. - All remanufactured devices and remanufactured main elements shall be clearly and permanently marked for the purposes of identification with the following information:

(a) The name, initials, or trademark of the last remanufacturer or distributor;

(b) The remanufacturer's or distributor's model designation if different than the original model designation. [Nonretroactive as of January 1, 2002]
(Added 2001)

Note: Definitions for "manufactured device," "repaired device," and "repaired element" are also included (along with definitions for "remanufactured device" and "remanufactured element") in Appendix D, Definitions.

Add new Table G-S.1. Identification as follows:

Table G-S.1. Identification

	Built-for-Purpose Instruments, Elements, or Systems	Not-Built-for-Purpose Devices or Elements
Name, initials, or trademark of the manufacture or distributor	M	D[2]
Model designation	M[1]	D[2]
Specific model designation[3]	M[1] or D	
Serial number	M	Not required
Metrological version or revision designation[3]	~~M or D~~ NA	D
Certificate of Conformance (CC) number	M or D	D[2]

M: **Physically and permanently marked**

D: ***Either: (1) displayed by accessing a clearly identified view only System Identification, G-S.1. Identification, or Weights and Measures Identification accessible through the "Help" menu. Required information includes that information necessary to identify the software in the device is the same type that was evaluated, or (2) continuously displayed. Note: For revision or software version number, clear instructions for accessing this information shall be listed on the CC in lieu of the "Help" menu. Required information includes that information necessary to identify the software in the device is the same or subsequent type that was evaluated.***
(Nonretroactive as of January 2004)

Note 1: ***As a minimum, the model designation (positively identifying the pattern, design, type, series, generic, or trademark designation) must be marked on the device. If the model designation changes with differing parameters such as size, features, options, intended application, not Handbook 44 compliant, construction, etc., the specific model designation shall be physically marked or continuously displayed or be capable of being displayed.***
(Nonretroactive as of January 200X)

Note 2: ***As a minimum, either the manufacturer or distributor and the model designation, or the CC Number shall be continuously displayed. Clear instructions for accessing the remaining required G-S.1.information shall be listed on the CC~~, which may be available as an unaltered copy of the CC or printed by the device or through another on site device~~.***
(Nonretroactive as of January 200X)

Note 3: ***Metrological version or revision designation for devices with downloadable or field programmable software.***

3. Ad Hoc Procedures for Class I and II Scales used in Prescription Filling Applications

Source: 2003 NTETC Weighing Sector Agenda Item 14 b.

Background: See the 2003 S&T Committee Annual Report Item 320-2 for additional background information. During its 2003 Annual Meeting, the NCWM agreed to modify paragraph S.1.2.3. of NIST Handbook 44. The approved language was incorporated in the 2004 Edition of NIST Handbook 44.

At its 2003 meeting, the Weighing Sector reviewed the language adopted by the 88th NCWM at its annual meeting and discussed a draft checklist developed by Brian Christopher (McKesson) that was distributed to the Sector. The Sector discussed the need to verify that minimum piece weight and piece count limits required by the new language in Handbook 44 are effective. Additionally, NTEP tests should be conducted with counts and loads that are less than the minimums in new paragraph S.1.2.3. that verify the scale is prevented from displaying a total piece count (e.g., 29 e and/or 9 pieces for samples to determine piece weights). There was a discussion that the scale cannot be recalibrated while evaluating the counting feature. The manufacturers explained that it is possible to have inaccurate weight measurements and still have correct count indications. Additionally, the recommended checklist should include verification of new marking requirements.

At the request of the Sector, the Publication 14 evaluation checklist submitted by Brian Christopher was further developed with the assistance of the participating laboratories, the NTEP director, and the NIST technical advisor and was used on an *ad hoc* basis until the procedure could be fully evaluated and accepted by the Sector.

The NTEP participating laboratories have used the *ad hoc* procedures on several evaluations this past year. Neither the applicants nor the laboratories identified any procedural issues.

Discussion: The Weighing Sector discussed the ***ad hoc*** procedures and noted that they did not include a reference to Handbook 44 specification paragraph S.2.5.3. Class I and II Prescription Scales with a Counting Feature and recommended an amendment to the procedures to correct the omission.

During the review of paragraph S.2.5.3., there was a discussion regarding motion detection requirements for recording elements that can print the number of pills when there is no display of weight in the counting mode. Currently, there is no language in the Scales Code that requires an effective means to permit the recording of count values when the count indication is stable. The Sector discussed the possibility of adding a motion detection requirement for the printing or recording of count. There was also a discussion questioning which "quantity" was required to have a stable indication. The Sector believes that the paragraph could be editorially amended to provide clarification that the term "quantity" is intended to be the sample quantity.

The Sector also discussed the *ad hoc* procedure abbreviations for minimum sample size (MSS), minimum piece weight (MPW), and minimum sample size in weight (MSSW) and agreed to recommend the abbreviations be listed in Publication 14 Section 75 List of Acceptable Abbreviations/Symbols.

Recommendation: **The Weighing Sector recommends the *ad hoc* procedures, as amended by the Sector, be added to Publication 14 as shown in Appendix A agenda Item 3.**

The Sector also recommends that paragraph S.2.5.3. be editorially amended to clarify that the quantity placed on the load-receiving element is for sample piece weight determination as follows:

> **S.2.5.3. Class I and Class II Prescription Scales with a Counting Feature. - A Class I or Class II prescription scale shall indicate to the operator when the piece weight computation is complete by a stable display of the sample quantity placed on the load-receiving element.**

Additionally, the Sector recommends amending paragraph S.2.5.1. Digital Indication Elements to clarify that the recording of indicated count values must be stable.

> **S.2.5.3. Class I and Class II Prescription Scales with a Counting Feature. - A Class I or Class II prescription scale shall indicate to the operator when the piece weight computation is complete by a stable display of the**

sample quantity placed on the load-receiving element. Prescription scales with a counting feature and recording element shall be equipped with effective means to permit the recording of count values only when the indication is stable within plus or minus 1 piece.

4. S.1.1.c. Zero Indication (Marking Requirements)

Source: 2003 Weighing Sector Agenda Item 19 - Screen Savers on Electronic Cash Registers and Point-of-Sale Systems.

Background: See the Report of the 89th National Conference on Weights and Measures, NTEP Committee Report 2003 NTETC Weighing Sector Meeting Summary agenda Item 19, and the S&T Committee Report agenda Item 320-8 for additional background information.

Discussion/Recommendation: **The Sector reviewed the background information and accepted the 2004 S&T Committee interpretation of the intent of the 78th NCWM. However, the majority members of the Sector stated that no additional wording was needed since changes had already been added to Publication 14 that clarified that additional marking is required for weighing devices that use indications other than a digital zero to indicate the scale is operational and at a zero-balance condition.**

During the discussion, some of the Sector members stated that is not appropriate for the Sector to further develop the proposal when the S&T Committee interpretation answered the Sector's questions. Additionally, the Sector stated that commenting on S&T Committee agenda items that have no impact on type evaluation and Publication 14 have a low priority and are typically discussed at the end of the Sector meeting if time permits.

The Sector recommends that no changes be made to the existing language in Handbook 44 Scales Code paragraph S.1.1. (c) Zero Indication. Additionally, the Sector did not have time at the end of its meeting to further discuss this item.

New Items

5. Bench/Counter Scale Shift Test and Definitions

Source: NIST WMD

Background: During the 2002 meeting of the Weighing Sector, the NTEP director reported some confusion in the classification of bench/counter scales and other platforms and the location of test load while performing a shift test. Bench/counter and other platforms have different shift test positions depending if a scale is located on a counter or on the floor. The problem is compounded when a family of scales covers both bench/counter and other platform applications. **Bench and counter scale** shift tests are conducted with a one-half capacity test load centered successively at four points equidistant between the center and the front, left, back and the right edges of the load-receiving element (N.1.3.1.). **Other platform scale** shift tests are conducted with a one-half capacity test load centered, as nearly as possible, successively at the center of each quadrant.

The Weighing Sector proposal to amend Handbook 44 was intended to align the U.S. and Measurement Canada's shift test procedures that are based on the number of load supports in the scale. During the 2003 NCWM Annual Meeting, the Specifications and Tolerance Committee (S&T) agreed with comments from industry and weights and measures officials that paragraphs N.1.3.1. and N.1.3.8. already adequately address shift test procedures and any change would create confusion. The Committee agreed that the proposal to modify the definition of counter scale, as written, does not provide weights and measures officials with a means to determine the shift test procedure that is appropriate for a scale design (single or four load supports). The Committee recognized the difficulty or reluctance of field officials to dismantle a scale to determine its design. Consequently, the Committee changed this item's status to an information item and recommended the Weighing Sector consider the practice of including scale design information on all NTEP Certificates of Conformance to assist officials in performing shift tests.

The NIST technical advisor revised the 2002 Sector proposal to remove the reference to the number of load supports, align Handbook 44 shift test procedures for scales with OIML R76, and delete the definition for bench and counter

scales. The NTEP participating laboratories have been requested to conduct a series of tests on instruments currently under NTEP evaluation comparing shift test results between the current Handbook 44 procedures and the shift test procedures in the following proposal. Note: The proposal does not permit corner testing for scales less than or equal to 150 kg. This limit was selected since corner testing is allowed if there are not enough test weights to perform the shift test or if the scale has four load supports, and Table 4 Minimum Test Weights requires that scales with a capacity of 150 kg or less have test weights up to 100 % of the scale capacity.

Proposal: Delete the definition of Bench and Counter Scale:

~~**bench scale.** See "counter scale."[2.20]~~

~~**counter scale.** One that, by reason of its size, arrangement of parts, and moderate nominal capacity, is adapted for use on a counter or bench. Sometimes called "bench scale."[2.20]~~

Delete Scales Code paragraph N.1.3.1. Bench and Counter Scales:

~~**N.1.3.1. Bench or Counter Scales.** A shift test shall be conducted with a half capacity test load centered successively at four points equidistant between the center and the front, left, back, and right edges of the load-receiving element.~~

Renumber remaining N.1.3.X paragraphs and amend paragraph N.1.3.8 as follows:

N.1.3.7~~8~~. All Other Scales Except Crane Scales, Hanging Scales, Hopper Scales, Wheel-Load Weighers, and Portable Axle-Load Weighers. - A shift test shall be conducted using the following prescribed test loads and test patterns. ~~**For livestock scales, the shift test load shall not exceed one-half the rated section capacity or one-half the rated concentrated load capacity, whichever is applicable. A shift test shall be conducted using either:**~~

~~**(a) A one-quarter nominal capacity test load centered as nearly as possible, successively over each main load support as shown in the diagram below; or**~~
~~**(Added 2003)**~~
~~**(b) A one-half nominal capacity test load centered as nearly as possible, successively at the center of each quarter of the load-receiving element as shown in the diagram below.**~~

(a) For scales greater than 150 kg (300 lb) a shift test load may be conducted by either using one-third nominal capacity test load centered as nearly as possible at the center of each quarter of the load receiving element as shown in Figure 1 below, or by using a one-quarter nominal capacity test load centered as nearly as possible, successively over each corner of the weighing/load receiving element as shown in Figure 2 below.

(b) For scales with a nominal capacity of 150 kg (300 lb) or less, a shift test load shall be conducted using a one-third nominal capacity test. The load shall be applied centrally in the segment if a single weight is used, or applied uniformly over the segment, if several small weights are used.

(c) For livestock scales, the shift test load shall not exceed one-half the rated section or concentrated load capacity using the prescribed test pattern as shown in Figure 1, or one-quarter the section or concentrated load capacity as shown in Figure 2 below.

Figure 1

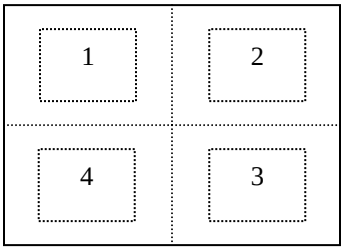
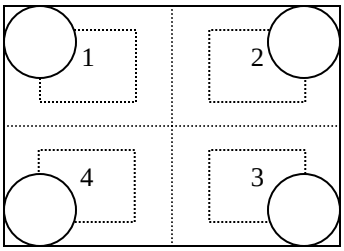


Figure 2



= Load Bearing Point

(Amended 1987, ~~and~~ 2003**, and 200X)**

Discussion/Recommendation: **The NIST technical advisor reported that no data had been received by the time of the Sector meeting. The Weighing Sector continues to support aligning the shift test requirements in Handbook 44 with the equivalent requirements in OIML R76 Non-automatic Weighing Instrument to the fullest extent possible.**

The Sector agreed with the proposal and commented that the exact test load of one-third capacity is not required or necessary. They also agreed that the test load of one-third capacity in the recommended test positions is roughly equivalent to one-half capacity in the current test load position for bench and counter scales. Since the test positions for other platform scales are not changed in this proposal and are tested at one-third instead of one-half capacity, the Sector believes that data should be collected to verify that the proposed test load would not pass scales that would have failed under the current test load requirements.

The Sector agreed to forward the above proposal as an information or developmental item to the regional weights and measures associations and the NCWM S&T Committee. The Sector further requests data demonstrating the performance differences or similarities between the current and proposed test procedures from the NTEP labs and other jurisdictions.

6. Automatic Zero-Setting Mechanism (Zero-Tracking)

Source: NIST WMD

Background: During the 2002 meeting of the Weighing Sector discussion on shift test positions, the NTEP director reported some confusion in the classification of bench/counter scales and other platforms and the range of the automatic zero-setting mechanism (AZSM). Bench/counter and other platforms have different zero-tracking requirements depending if a scale is located on a counter or on the floor. The problem is compounded when a family of scales covers both bench/counter and other platform applications. **Bench and counter scale** limit for AZSM is 0.6 e (S.2.1.3.a). **Other platform scales** limit AZSM to 1.0 e (S.2.1.3.c).

The NIST technical advisor and the participating NTEP laboratories recommended the following proposal to amend Handbook 44, Scales Code paragraph S.2.1.3. Scales Equipped with an Automatic Zero-Setting Mechanism to remedy the problem and partially align AZSM requirements with Measurement Canada and OIML R76 recommendations. The following proposal retains AZSM requirements for Class III L weighing instruments.

S.2.1.3. Scales Equipped with an Automatic Zero-Setting Mechanism (Zero Tracking). *- ~~Under normal operating conditions the maximum load that can be "rezeroed," when either placed on or removed from the platform all at once, shall be:~~*

S.2.1.3.1. - For scales manufactured before January 1, 200X, the maximum load that can be "rezeroed," when either placed on or removed from the platform all at once under normal operating conditions, shall be:

(a) for bench, counter, and livestock scales: 0.6 scale division;

(b) for vehicle, axle-load, and railway track scales: 3.0 scale divisions; and

(c) for all other scales: 1.0 scale division.
[Nonretroactive and enforceable as of January 1, 1981]

S.2.1.3.2. - For scales manufactured after January 1, 200X, the maximum load that can be "rezeroed," when either placed on or removed from the platform all at once under normal operating conditions, shall be:

(a) for vehicle, axle-load, and railway track scales: 3.0 scale divisions; and

(b) for all other scales: 0.5 scale division.
[Nonretroactive and enforceable as of January 1, 200X]

S.2.1.3.3~~1~~. Automatic Zero-Setting Mechanism (Zero Tracking) on Class III L Devices - *Class III L devices equipped with automatic zero-setting mechanisms shall be designed with a sealable means to allow the automatic zero setting to be disabled during the inspection and test of the device.*
[Nonretroactive as of January 1, 2001]
(Added 1999) (Renumbered 200X)

Discussion/Recommendation: **The Sector agrees with the concept of the proposal and the alignment of Handbook 44 with OIML R76. The public Sector members discussed the implication the proposal may have on field officials in determining the date of manufacture of other platform scales (i.e., floor scales) when verifying compliance with AZSM (zero-tracking) requirements. Since other platform scales currently have a zero tracking requirement of 1 e, some of the public members were concerned about the ability of field officials to determine the date of manufacture of these scales to verify if it complied with 1 e or 0.5 e.**

The private Sector members were concerned with the effective date of the proposed requirements and suggested a delay of several years in the effective date. This would allow manufacturers to avoid costly changes to their products that are nearing the end of their production cycle. This may also allow time for field officials to become trained in the requirements before the requirement becomes effective.

The Sector recommended this item be forwarded to the regional weights and measures association and the NCWM S&T Committee as a developmental item in order to gather information on the impact on field evaluations.

7. Prescription Scale with an Operational Counting Feature

Source: Mettler Toledo

Background: Handbook 44, paragraph S.6.6. Counting Feature, Minimum Individual Piece Weight and Minimum Sample Piece Count states:

S.6.6. Counting Feature, Minimum Individual Piece Weight and Minimum Sample Piece Count – A Class I or Class II prescription scale with an operational counting feature shall be marked with the minimum individual piece weight and minimum number of pieces used in the sample to establish an individual piece weight.

This marking is unnecessary if proper operation is confirmed during the NTEP evaluation using the defined minimum values since paragraph S.1.2.3. states:

S.1.2.3. *A Class I or Class II prescription scale with an operational counting feature shall not calculate a piece weight or total count unless the sample used to determine the individual piece weight meets the conditions:*

minimum individual piece weight is greater than or equal to 3 e; and
minimum sample piece count is greater than or equal to 10 pieces.
(Added 2003)

During the NTEP evaluation, a series of tests are conducted to determine these values as a minimum operation requirement. These tests could also be conducted in the field to confirm continued compliance with this requirement.

For example:

A test weight equal to 30 e or more is placed on the platter; a sample size of less then 10 is entered or selected. If the device displays a total count, the instrument fails the test.

A test weight of less than 30 e is placed on the platter; a sample size of 10 or more is entered or selected. If the device displays a total count, the instrument fails the test.

A test weight of less than 30 e is placed on the platter; a sample size of less than 10 is entered or selected. If the device displays a total count, the instrument fails the test.

A test weight equal to 30 e is placed on the platter; a sample size of 10 is entered or selected. If the device displays the proper count, the instrument passes and the marking requirements are waived. If the evaluation shows that the minimum sample weight must be greater than 30 e or the sample size must be greater than 10 for the instrument to perform an accurate count, the marking requirements are mandatory.

It is certainly within a scale's ability to compare the operator entered or selected, the sample size to ensure that the number is 10 or greater, and then to divide the weight on the platter to ensure that the sample weight is equal to or greater than 30 increments. The above test examples would confirm compliance to this requirement and remove the need to have this information marked on the scale.

The submitter of this item recommended amending Handbook 44, Scales Code, S.6.6. to remove the marking requirements for the minimum individual piece weight and minimum number of pieces providing the instrument conforms to both individual minimum values as stated in paragraph S.1.2.3. as follows:

> **S.6.6. Counting Feature, Minimum Individual Piece Weight and Minimum Sample Piece Count –** A Class I or Class II prescription scale with an operational counting feature shall be marked with the minimum individual piece weight and minimum number of pieces used in the sample to establish an individual piece weight <u>if the minimum individual piece weight or the minimum number of pieces used to establish an individual piece weight is different from that specified in S.1.2.3. a and b.</u>

NOTE: The NIST technical advisor suggests the Sector consider the potential confusion created or implications involved if an applicant submits a scale with minimums smaller than specified in S.1.2.3. a and b.

Discussion/Recommendation: **Mettler Toledo withdrew this item from the Weighing Sector agenda since the proposal did not relate to problems encountered with Publication 14 type evaluation procedures. Additionally, there was no additional time at the end of the meeting to further discuss this item.**

8. "#" Symbol

Source: **Rice Lake Weighing Systems (RLWS)**

Background: **NCWM Publication 14 Section 75 List of Acceptable Abbreviations/Symbols lists "#" as an acceptable (but discouraged) symbol for recorded representations for electronic cash registers (ECR) and point-of-sale systems. RLWS reasons that if the symbol is suitable for recorded representations for ECRs, there is no justification for its prohibition for other recorded representations or markings. It should either be Acceptable or <u>Not</u> Acceptable.**

According to the 61st NCWM Annual Report, the "#" was originally allowed in 1976 because of space limitations on recording elements. The "#" only took up one column where "lb" took two columns. The "#"was also allowed since it was reported that it is used in the dictionary.

The NIST technical advisor also noted the symbol is known by many names such as the octothorp, dry pound, avoirdupois pound, number, hash, sharp, crunch, hex, grid, crosshatch, square, pig-pen, ticktacktoe, scratch mark, thud, thump, and splat. In cartography, it is the symbol for a village (eight fields around a central square). The U.S.

usage is derived from an old-fashioned commercial practice of using a "#" suffix to tag pound weights on bills of lading. Outside the U.S., the symbol is usually pronounced "hash" (the British symbol for pound is "£").

The submitter recommends the "#" symbol be removed from Publication 14 as an acceptable symbol and be reclassified as no longer acceptable based upon the changes in printer technology over the past 30 years and multiple definitions of the "#" mark. Additionally, Handbook 44 Scales Code footnote for paragraph S.1.8.4. Recorded Representations, Point-of-Sale Systems should be amended to eliminate the use of the "#" symbol as follows:

[1] Weight values shall be identified by kilogram, kg, grams, g, ounces, oz, pound, or lb~~, or the sign "#."~~. For devices interfaced with scales indicating in metric units, the unit price may be expressed in price per 100 grams.
(Amended 200X)

Discussion/Recommendation: **The Weighing Sector agreed that the "#" symbol should be removed from Publication 14 as an acceptable symbol and be reclassified as no longer acceptable based upon the changes in printer technology over the past 30 years and multiple definitions of the "#" mark. Additionally, Handbook 44 Scales Code footnote for paragraph S.1.8.4. Recorded Representations, Point-of-Sale Systems should be amended to eliminate the use of the "#" symbol as follows:**

> **[1] Weight values shall be identified by kilogram, kg, grams, g, ounces, oz, pound, or lb~~, or the sign "#."~~. For devices interfaced with scales indicating in metric units, the unit price may be expressed in price per 100 grams.**
> **(Amended 200X)**

9. Elimination of Temperature Testing for Separable Weighing/load-receiving Elements

Source: **Rice Lake Weighing Systems (RLWS)**

Background: RLWS eported temperature testing (influence factor) failures of separable weighing/load-receiving elements that incorporate load cells that have an NTEP Certificate of Conformance (CC). RLWS builds the instrument to be submitted for tests using load cells from their inventory, installs them into a weighing/load-receiving element, and performs the room temperature testing before submitting the instrument to the NTEP laboratory for evaluation. The instrument passes all applicable tests performed at room temperature but fails the temperature test. RLWS reported that the load cells are from a well-known and respected load cell manufacturer. When RLWS contacted the load cell manufacturer, they responded by stating, "You should have told us these load cells were for NTEP testing." RLWS stated that the load cell manufacturer will send them four "GOLDEN" load cells that have been separately temperature tested to enable the weighing/load receiving element to pass temperature testing. RLWS further stated that it takes between 4 to 6 weeks or longer to receive load cells if they are requested for a weighing/load-receiving element to be submitted for NTEP evaluation.

An NTEP laboratory reported to RLWS that load cell manufacturers told other weighing/load-receiving element NTEP applicants the same thing after their weighing/load-receiving element failed the NTEP temperature testing.

RLWS does not believe that separable weighing/load-receiving elements using load cells that have an NTEP CC should be subject to additional temperature testing for the following reasons:

- Weighing/load receiving elements over 2000 lb are not subject temperature testing by NTEP;
- The NCWM Conformity Assessment program will help assure that production load cells comply with temperature and other influence factor requirements; and
- The costs associated with the temperature test for the weighing/load-receiving element can become excessive when the load cells already comply with temperature tests, especially if there is a failure. RLWS has provided a breakdown of NTEP costs associated with the temperature test using the Ohio NTEP laboratory rate schedule.

RLWS acknowledged that Measurement Canada does not approve load cells and that temperature testing may still be required for an evaluation approval under the Mutual Recognition Agreement.

The NIST technical advisor has contacted two load cell manufacturers and inquired what they did to provide a scale applicant with "golden" load cells. They reported that they retest and select the load cells that are well within the error requirements. They also acknowledged that load cells are NTEP evaluated in ideal loading conditions. There are no load cell tests that simulate off-center loading caused by deflection of the load-receiving element and changes to the mechanical interface at different temperatures between the load cell mount and the load-receiving element.

RLWS recommended amending Publication 14 by removing the temperature testing of separable bench and other platform weighing/load receiving elements and establishing a new tolerance for these devices while tested at room temperature.

Time	Cost	Description
1 hour	$110	Set-up of weighing/load-receiving element
2 hours	$220	Full test (increasing/decreasing, shift, corner)
1 hour	$110	Increasing/decreasing at temperature. –10 ^{o} (FAIL)
Chamber	$200	Billed for a half cycle of the temperature chamber
1 hour	$110	Ship weighing/load-receiving element back to manufacturer
*		Ship weighing/load-receiving element back to manufacturer
*		Order "GOLDEN" load cells to pass temperature tests
*		Remove original load cells, install new load cells, and re-test at room temp
*		Ship weighing/load receiving element back to lab
1 hour	$110	Setup of weighing/load receiving element
2 hours	$220	Full test (increasing/decreasing, shift, corner)
1 hour	$110	Increasing/decreasing at temperature.
Total	**$1190**	**Costs to the point where the failure occurred**
* Additional time to complete an evaluation and applicant costs		

Divisions	Acceptance Tolerances Complete Weighing Device	Acceptance Tolerances Weighing/load-receiving Element with Temp Testing	Acceptance Tolerances Weighing/load-receiving Element only room Temp Testing
0 to 500	0.5 e	0.35 e	0.30 e **(proposed)**
501 to 2000	1.0 e	0.70 e	0.60 e **(proposed)**
2001 to 4000	1.5 e	1.05 e	0.70 e **(proposed)**
4001 to 10 000	2.0 e	1.40 e	0.80 e **(proposed)**

This recommended new tolerance applies to weighing/load-receiving elements that meet the following criteria:

1. Weighing elements must have NTEP-approved load cells with an n_{max} of 5000 and must be approved for temperatures –10 °C to + 40 °C (14 °F to 104 °F).

2. Weighing elements Certificate of Conformance (CC) will specify the load cell used during the evaluation and state that a similar NTEP-approved load cell could be used.

NOTE: The replacement load cell must have an n_{max} of 5000 and be approved for temperatures –10 °C to + 40 °C (14 °F to 104 °F).

The Weighing Sector should consider that the proposed change to amend Publication 14 tolerances for weighing/load-receiving elements tested at room temperature would likely require supporting language in NIST Handbook 44.

Additionally, the proposal, as submitted, will continue to require temperature testing if the load cell does not have an NTEP CC or if the load cells have a temperature range other than –10 °C to 40° C.

The technical advisor seeks input from manufacturers that are holders of OIML R76 test reports conducted by other international laboratories and information on the international policies regarding the testing of these devices that use OIML R60 load cells.

Discussion: During the discussion of this item, the NIST technical advisor reported that load cell manufacturers do not make special cells for weighing/load-receiving elements that are submitted for type evaluation. The load cell manufacturers reported that they select load cells with errors that are well within the maximum permissible errors if they know a weighing/load-receiving element is to be submitted for type evaluation.

Some of the NTEP participating laboratories reported that they continue to see problems with weighing/load-receiving elements during the influence factor tests that do not comply with tolerances. The NTEP applicants have stated that the materials used in the construction of weighing/load-receiving elements and components in load cell junction boxes that are affected by influence factors were the reason the device failed influence factor testing.

A manufacturer commented that weighing/load-receiving elements above 2000 lb are also required to comply with influence factor requirements and suggested that NTEP perform testing above the 2000 lb limit. Another manufacturer stated that international laboratories testing for compliance with OIML R76 for Non-automatic Weighing Instruments do not evaluate weighing/load-receiving elements above 1000 kg (2000 lb). Additionally, the manufacturer reported that R76 used a different apportion of errors for evaluation of elements (modules) that reduced the problems encountered by NTEP.

The NTEP director expressed concern with the current apportionment of errors for separable elements and load cells. The load cells used in weighing/load-receiving elements have an "M" (multiple load cell application) designation, which means that a 1.0 factor is applied to the applicable tolerance. This may present a problem with weighing/load-receiving elements since they are evaluated to a tighter tolerance (0.7 time the applicable tolerance) than the load cells.

Recommendation: **Based upon the discussion and comments, the submitter withdrew its proposal.**

10. Time Dependence Tolerances

Source: NIST WMD and NTEP Laboratories

Background: John Elengo, in his comparison of Handbook 44, OIML R76 – Non-automatic Weighing Instruments, and OIML R60 – Load Cells, provided the following background information on the development and evolution of Handbook 44 Scales Code T.N.4.5. Time Dependence.

> Prior to the establishment of Handbook 44 paragraph T.N.4.5., there was no such U.S. requirement for "creep" and, at the time of its consideration, the OIML requirement was based on a 4-hour period. This was considered excessive, especially since the error is primarily that of the load cells used in a scale. Generally, the greatest amount of load cell creep occurs during a short period (minutes) immediately following a step change in load. Thereafter, the output becomes more and more constant. Hence, Handbook 44 adopted a 1-hour requirement rather than a 4-hour requirement. Some years later and during the course of revising OIML R60, it became evident that most international evaluation laboratories were not conducting the 4-hour test but a shorter one, and the creep proved to stabilize sufficiently during this shorter test. The assumption was made that it would meet the 4-hour requirement. This assumption was verified by sample tests. Based on this experience and that gained in the international comparison of load cell evaluations, the international work group for R60 concluded that a 30-minute test is sufficient provided that, in addition to measuring the difference over a 30-minute period, the difference occurring in the last 10 minutes of this period be measured also. A more restrictive allowance than the total allowance for the 30-minute period is applied to the 10-minute period difference in order to assure the creep is becoming more and more constant and not increasing. OIML R76 adopted the R60 30-minute requirement. In so doing, the requirement now applies to the instrument as a whole and not only to the load cell. If main components other than the load cell are a source of creep, they can be accounted for using the principle of apportionment of errors (including the

assignment of fractions *pi* to those various separate main components of an instrument that can be evaluated separately). [refer to R76-1, 3.5.4]

This item was further discussed at the 2004 meeting of the NTEP participating laboratories where they agreed to forward a proposal to align Handbook 44 with R76 and R60. However, there was some discussion about the accuracy class marking for load cells (A, B, C, and D). Steve Patoray indicated that OIML recommended load cells be marked with letter accuracy class designations so that load cells would not be confused with scales. This is consistent with the NTEP policy that a load cell by itself does not constitute a weighing/load-receiving element. The labs felt that there would be confusion by field inspectors if scales could have load cells marked with either an alpha or numeric accuracy class.

The NIST technical advisor recommended amending paragraph T.N.4.5. and adding new paragraphs T.N.4.5.1. and T.4.5.2. to include performance and zero return requirements that are aligned with OIML R76 and R60 as follows:

T.N.4.5. Time Dependence (Creep) for Non-automatic Weighing Instruments (Scales) during Type Evaluation. - ~~At constant test conditions, the indication 20 seconds after the application of a load and the indication after 1 hour shall not differ by more than:~~

~~(a) one-half of the absolute value of the applicable tolerance for the applied load for class III L devices; and~~

~~(b) the absolute value of the applicable tolerance for the applied load for all other devices.~~
~~(Amended 1989)~~

T.N.4.5.1. A non-automatic weighing instrument of Class II, III, and IIII shall meet the following requirements at constant test conditions:

(a) When any load is kept on an instrument, the difference between the indication obtained immediately after placing a load and the indication observed during the following 30 minutes shall not exceed 0.5 e.

(b) However, the difference between the indication obtained at 15 minutes and that at 30 minutes shall not exceed 0.2 e. If these conditions are not met, the difference between the indication obtained immediately after placing a load on the instrument and the indication observed during the following four hours shall not exceed the absolute value of the maximum permissible error at the load applied.

(c) The deviation on returning to zero as soon as the indication has stabilized, after the removal of any load which has remained on the instrument for one half hour, shall not exceed 0.5 e.

For a multi-interval instrument, the deviation shall not exceed 0.5 e_1 (first weighing segment).

On a multiple range instrument, the deviation on returning to zero from Max_i (load in the applicable weighing range) shall not exceed 0.5 e_i (interval of the weighing segment). Furthermore, after returning to zero from any load greater than Max_1 (capacity of the first weighing range) and immediately after switching to the lowest weighing range, the indication near zero shall not vary by more than e_1 (interval of the first weighing range) during the following 5 minutes.

T.N. 4.5.2. A weighing instrument of Class III L shall meet the following requirements:

(a) When any load is kept on an instrument, the difference between the indication obtained immediately after placing a load and the indication observed during the following 30 minutes shall not exceed 1.5 e.

(b) However, the difference between the indication obtained at 15 minutes and that at 30 minutes shall not exceed 0.6 e. If these conditions are not met, the difference between the indication obtained immediately after placing a load on the instrument and the indication observed during the following four hours shall not exceed the absolute value of the maximum permissible error at the load applied.

The deviation on returning to zero as soon as the indication has stabilized, after the removal of any load which has remained on the instrument for one-half hour, shall not exceed one-half of the absolute value of the applicable tolerance for the applied load for Class III L devices.

Add new paragraphs T.N.4.6. through T.N.4.6.3. and Table T.N.4.6.2. to include tolerances for load performance and zero repeatability that are aligned with OIML R60.

T.N.4.6. Time Dependence (Creep) for Load Cells during Type Evaluation. – A load cell (force transducer) marked with an accuracy class, shall meet the following requirements at constant test conditions:

T.N. 4.6.1. - With a constant maximum load for the measuring range, D_{max}, between 90 % and 100 % of maximum capacity, E_{max}, applied to the load cell, the difference between the initial reading and any reading obtained during the next 30 minutes shall not exceed the absolute value of the maximum permissible error (mpe) for the applied load (see N.4.6.2.). The difference between the reading obtained at 20 minutes and the reading obtained at 30 minutes shall not exceed 0.15 times the absolute value of the mpe (see N.4.6.2.).

T.N.4.6.2. - The mpe for creep shall be determined from Table 5 using the following apportionment factors (pLC):

pLC = 0.7 for load cells marked with S (single load cell applications), and
pLC = 1.0 for load cells marked with M (multiple load cell applications)

Table T.N.4.6.2. Maximum Permissible Errors (mpe) on Type Evaluation

Tolerance (mpe)	Load (m)			
	Class I	**Class II**	**Class III**	**Class IIII**
pLC x 0.5v	0 ≤ 50 000v	0 ≤ m ≤ 5000v	0 ≤ m ≤ 500v	0 ≤ m ≤ 50
pLC x 1.0v	50 001v ≤ m ≤ 200 000v	5001v ≤ m ≤ 20 000v	501v ≤ m ≤ 2000v	51v ≤ m ≤ 200v
pLC x 1.5v	200 001v < m	20 001v ≤ m ≤ 100 000v	2001v ≤ m ≤ 10 000v	201v ≤ m ≤ 1000v
	Load m, Class III L			
pLC x 0.5v	0 ≤ m ≤ 500v			
pLC x 1.0v	501 ≤ m ≤ 1000v *			

* Add 0.7 to the tolerance for each 500 v of load or fraction thereof up to a maximum load of 10 000 v for load cells marked with S.
* Add 1.0 to the tolerance for each 500 v of load or fraction thereof up to a maximum load of 10 000 v for load cells marked with M.

The NIST technical advisor acknowledges that this proposal and the proposal in the following agenda item address the alignment issue in small steps. Another possible alternative for aligning Handbook 44 and Publication 14 with OIML R60 is to consider incorporating OIML R60 chapters 1 through 7 by reference into Handbook 44 and OIML R60 Annexes A through E into Publication 14. Handbook 44 and Publication 14 could further include paragraphs that state which requirements are not adopted, are different than, or are in addition to OIML R60.

Discussion/Recommendation: **The Weighing Sector discussed the impact and implications of amending the marking requirements for load cells to align with the marking requirements in OIML R60 (see applicable extracts of OIML R60 marking requirements and selection guidelines in Appendix A). One of the Sector members noted that the proposal for time dependence testing did not include Class I scales (*Note: OIML R76 does not require Class I scales comply with time dependence (creep) requirements*). However, the current language in Handbook 44 paragraph TN.4.5. includes Class I scales.**

The Sector withdrew this item from the Weighing Sector agenda since the proposal did not relate to problems encountered with Publication 14 type evaluation procedures. Additionally, there was no time at the end of the meeting to further discuss this item.

11. Publication 14 Force Transducer (Load Cell) Family and Selection Criteria

Source: NTEP Committee Technical Advisor

Background: The OIML Mutual Acceptance Agreement (MAA) was adopted at a recent International Committee on Legal Metrology (CIML) meeting in Kyoto, Japan, in November 2003. The agreement will likely allow NTEP to accept (and eventually exchange) reports and test data for load cells that have been evaluated to OIML R60 – Load Cells requirements. The data then can be evaluated to NCWM Publication 14 requirements in order to issue an NTEP Certificate of Conformance. Although the MAA does not require the U.S. and NTEP requirements to be fully harmonized and aligned with the requirements in R60, it does require that NTEP identify the differences **between the** requirements so that an OIML applicant is aware of additional testing and policies applicable to its load cells such as markings, Class III L tolerances, and family and selection guidelines.

Additionally, the original NTEP Publication 14 load cell family and selection guidelines were originally developed prior the adoption of similar guidelines in the 2000 revision of OIML R60. John Elengo and the U.S. National Work Group developed and submitted the guidelines that are currently in R60.

The NIST technical advisor recommended that the selection guidelines and definition of a load cell family in OIML R60 be incorporated in NCWM Publication 14 to the fullest extent possible. Additionally, it was suggested that the Sector consider making a recommendation to adopting the R60 marking requirements into Handbook 44. The primary difference between R60 and Handbook 44 are markings for humidity and accuracy classes. The R60 class markings for load cells are A, B, C, and D. Handbook 44 class markings for load cells are the same for scales and load cells (I, II, III, III L and IIII). It has been reported that the purpose of different class markings for R60 load cells was to ensure that a load cell and indicating element would not be considered a non-automatic weighing instrument. This is consistent with the NTEP policy stating that a load cell incorporated with a tank, hopper, hook or platform does not convey that the load cell (and indicating element) CC covers the complete weighing system.

Discussion: The NTEP director summarized the current NTEP load cell selection process as follows:

- One load cell would be selected if the family is small (e.g., 10:1).
- The capacity selected would be close to the middle of the family and within 4:1 of the highest and lowest capacity load cell in the family.

Using this process, NTEP typically selects a capacity that is not the most difficult to manufacture but is likely to be the most popular. The R60 selection process typically selects load cells of a lower capacity, which are more difficult to build and manufacture. The NTEP system is significantly different from international requirements.

Several of the load cell manufacturers present agreed that the lowest capacity load cell is the most difficult to manufacturer. One of the manufacturers further stated that he believes the OIML R60 selection process is more stringent. However, the OIML R60 family definition is broader than NTEP, and they have not seen an increase or decrease in the number of cells submitted for evaluation.

Recommendation: The Weighing Sector agreed to assign a work group (Stephen Patoray (NTEP), Steven Cook (NIST), the NIST Force Group, Joseph Antkowiak (Flintec), Frank Rusk (Coti), and the California NTEP laboratory) to:

1. **Develop the definition of a family, determine load cell selection criteria, and develop an example of a load cell selection for 2005 NCWM Interim Meeting.**
2. **Review and adapt OIML R60 language for incorporation into Publication 14 for the next meeting of the Weighing Sector.**

The NIST technical advisor will forward an electronic copy of OIML R60 to assist the work group members.

12. Compatibility of Indicators Interfaced with Weighing and Measuring Elements

Source: NTETC Measuring Sector and NCWM S&T Committee

Background: See the Report for the 89th National Conference on Weights and Measures, Specifications and Tolerances Committee Agenda Item 310-2 for additional background information.

During its 2003 meeting, the NTETC Measuring Sector agreed to forward a proposal to the NCWM S&T Committee through the SWMA to add a new paragraph G-N.3. Compatibility of Indicators and Weighing or Measuring Elements to Handbook 44. The proposal intended to clarify what requirements must be met to interface an indicating element and a weighing or measuring element, each of which has its own NTEP CC listing compatible communication specifications, but not previously evaluated together on a single NTEP CC.

At the 2004 NCWM Interim Meeting, the S&T Committee heard several comments indicating that this item is not sufficiently developed to move forward. The S&T Committee decided to ***withdraw*** Item 310-2 from the S&T Committee agenda until it is further developed and resubmitted by the NTETC Weighing and Measuring Sectors.

Discussion: The Weighing Sector reviewed the background information. The NIST technical advisor reported that an *ad hoc* meeting may be scheduled on Saturday, October 23, 2004, with the Measuring Sector members attending the Southern Weights and Measures Association meeting in Gulfport, Mississippi, to discuss this item.

The Weighing Sector agreed with the NTEP director that the policies used by the NTETC Measuring Sector are very restrictive. Members of the Measuring Sector want to have policies for measuring elements that are as flexible as existing Weighing Sector policies. Weighing device policies permit separate main elements (e.g., indicators, load cells, and weighing elements) with separate NTEP Certificates of Conformance to be combined—a practice referred to as "mixing and matching"—to create weighing systems which are recognized by NTEP.

The representatives from Canada reported that their liquid-measuring device type evaluation laboratory performs additional evaluations on the pulse output from the measuring element and the pulse input capability of the indicating element. NTEP essentially evaluates the performance of the combination of elements.

Some of the Weighing Sector members believed that the proposal belongs in the Liquid-Measuring Devices Code. They also were concerned that the terms “previously evaluated” and “Handbook 44 compliant ticket” are not clear and need further development. Another concern expressed by the Weighing Sector was that the proposed language in G-N.3. (a) could be interpreted to mean that all combinations of communication means between elements would have to be evaluated without adequate Handbook 44 standards and Publication 14 tests.

Other Weighing Sector members believed `there are no significant compatibility issues with weighing devices. Separable indicating and weighing/load receiving elements will either work correctly (if properly installed and configured) or not be operable. The NTEP director discussed the fact that NTEP does have an issue with the compatibility of separable indicating and weighing/load receiving elements, especially with vehicle scales with several load cells. OIML R76 evaluates the minimum voltage per scale verification division, which has not been adopted in Handbook 44 and Publication 14. The combination of separable indicating and weighing/load-receiving elements would not be a suitable combination if the signal from the weighing/load-receiving element were too small for the indicating element. The resultant combination will appear to perform correctly, however, it may no longer comply with influence factors and have a zone of uncertainty that would be too large to display a stable weight.

The Weighing Sector also stated that they do not fully understand liquid-measuring device technology compatibility issues (i.e., pulse counting compatibility, partially compatible digital communications, and applicable NTEP liquid-measuring device testing) to give additional input on the proposal.

Recommendation: **The Sector believes that the proposal is not appropriate for weighing devices since the language could require all combinations of devices and communications be evaluated. The Weighing Sector agrees with the Measuring Sector that this is not the intent of the proposed language.**

The Sector supports the joint meeting of the NTETC Weighing and Measuring Sector members who are attending the 2004 SWMA Technical Conference. If the Sectors agree on the issues and proposal, then the proposal can be placed in the General Code; otherwise, any proposals should remain in the specific codes. If there is no clear consensus of that meeting, the Measuring Sector could request a separate work group to develop a proposal to address the compatibility of multiple elements issue.

13. Handbook 44 Computing Scales Interfaced with an Electronic Cash Register

Source: NTEP Participating Laboratories

Background: Field inspectors have reported to one of the NTEP laboratories that they are finding computing scales interfaced with electronic cash registers (ECR) where an ECR will accept weighing results from the computing scale, use the ECR's price look-up (PLU) to retrieve tare and unit price information, and calculate the total price. The inspectors have reported that a different unit price, tare, and total price may already be entered and displayed on the computing scale. What the customer sees on the display of the computing scale (the net weight, unit price, and total price) may not be what the customer is actually charged and printed on the ECR receipt. The NTEP laboratories have reported that at least three companies have requested this method of operation for NTEP certification.

In one example, the scale manufacturer is marketing the computing scale as a point-of-sale scale for use with an ECR. The computing scale has push button tare, percent tare, PLUs, gross/net display, and memory recall. The company wants to amend its CC to allow the scale's use in general applications and for use with an ECR. The company notes that this is one of the most important selling features for its product line. It gives the operator the ability to quote the price of an item without having to "ring it up" on the ECR.

The operation is addressed in Sections 11.15. to 11.21. of the 2004 Publication 14 Electronic Cash Registers Interfaced with Scales (ECRS) checklist. If the ECR were setup to meet the requirements of those sections there wouldn't be a problem. The company does not want to burden the end user with using a compatible ECR designed to work with a computing scale. The company stated that the computing scale, interfaced with an ECR, is already approved by a weights and measures jurisdiction.

The NTEP laboratories believe NIST Handbook 44 needs clarification in this area and are proposing the following paragraph be added to the Scales Code to address those areas already noted in NCWM Publication 14:

> **S.1.8.5. Computing Scale Interfaced to a Cash Register**. - A computing scale may interface with a cash register provided:
>
> (a) The cash register only records (serves as a printer) the information received from the scale.
> (b) The computing scale has tare capability.
> (c) The computing scale is not equipped with PLU capability.
> (d) The electronic cash register does not have any input to the computing scale in the process of determining the total price of a weighed item.

Discussion: The Sector reviewed the background information and proposed language for NIST Handbook 44. The Maryland participating laboratory added that in the example they encountered, a unit price that would be displayed on the scale would be different than the unit price associated with product look-up code in the electronic cash register. Tares can also be overridden. The device was subsequently submitted for NTEP evaluation and the identified problems were corrected. The participating laboratories believe there is no problem with the test performed in Publication 14; however, they stated that the field inspector does not have the information contained in Publication 14 and has not been trained to look for the problems identified in the background information.

Several Sector members stated that the Maryland field officials properly identified a problem with the agreement of indications, noted that the ECR and computing scale Certificates of Conformance did not list this combination of interfaces, and took appropriate corrective actions.

Recommendation: **The Sector agreed not to recommend the proposed changes to NIST Handbook 44 since there are currently appropriate means in Handbook 44 (G-S.5. Indicating and Recording Elements and G-S.2. Facilitation of Fraud), and the examination procedure outlines address these issues during field evaluation.**

14. Publication 14 Requirements for Computing Scales Interfaced with an Electronic Cash Register

Source: NTEP Participating Laboratories

Background: In addition to the background information in the above agenda item for computing scales interfaced with an electronic cash register (ECR), many computing scale manufacturers are not aware of the computing scale and ECR interface requirements in the ECRS checklist (electronic cash register interfaced with scales) in NCWM Publication 14. Also, there are no guidelines in the Digital Electronic Scales (DES) checklist to direct them to the appropriate language in the ECRS checklist.

The participating laboratories recommend that NCWM Publication 14 DES and ECRS be amended to:

1. Put a check box in the Publication 14 DES checklist that will state that the computing scale interfaced to an ECR meets the applicable requirements in the ECRS checklist, and

2. Add to the ECRS checklist: "If the scale has multiple sales accumulation capability, only weighed items are accumulated and the cash register only records the total accumulated price."

Discussion: The Sector discussed the proposal to amend Publication 14. The Sector agreed the addition to the DES checklist was appropriate. However, the Sector was concerned about the ability of a computing scale to have an operational accumulation capability while it was interfaced with an ECR because the receipt on an ECR itemizes purchases made by the customer, however the items that are accumulated on the computing scale would not be itemized in the ECR receipt.

Recommendation: **The Sector recommends that Publication 14 DES checklist be amended as proposed by the NTEP laboratories and that the proposal to amend the ECRS checklist be amended to require the computing scale accumulation capability be disabled if it can be interfaced with an ECR ("<u>If the scale has multiple sales accumulation capability,</u> ~~only weighed items are accumulated and the cash register only records the total accumulated price, or~~ the scale accumulation capability is disabled"<u>.</u>). The NIST technical advisor further recommended an editorial change to the ECRS checklist by renumbering paragraphs 11.15. through 11.21. to 11.15.1. through 11.5.7. to clarify the requirements are for computing scales interfaced with an ECR. The proposed recommendation to amend Publication 14 is in Appendix A, agenda Item 14.**

15. Publication 14 - Computing Scale Section

Source: NTEP Participating Laboratories

Background: The Weighing Sector discussed a Maryland NTEP laboratory proposal to clarify display identification, label formatting, and the use of other features (pre-pack, POS application, etc.) The NTEP laboratories agreed the computing scale section of the DES checklist lacks clarity in these areas.

The Maryland NTEP laboratory drafted amendments to NCWM Publication 14 DES Section 27 that clarifies checklist requirements for price computing scales.

Discussion: The Sector agreed with the proposal from the Maryland NTEP laboratory and reviewed the examples of correct and incorrect labels for compliance with applicable sections of NIST Handbook 130 Uniform Packaging and Labeling Regulation, including the use of "unit price" on the printed labels. The Sector suggested that the proposal be amended to correct the examples of correct labels that do no have a kg, lb, or count associated with the unit prices and add an additional example where the term "unit price" is correctly used on a label.

Recommendation: **The Sector recommends the proposal to amend Publication 14, Section 27, as modified by the Sector, be incorporated into Publication 14, as shown in Appendix A agenda Item 15.**

16. Publication 14 - New Items in Computing Scale Section

Source: Maryland Participating Laboratory

Background: This item is related to the computing scale proposal in agenda Item 15 and was included in the original discussion at the NTEP laboratory meeting. The Maryland NTEP laboratory believed the computing scale section of the DES checklist lacked clarity in the areas of multiple uses of displays, position of displays, and the use of other features (e.g., pre-pack)

Generally, manufacturers use the "unit price" or a separate display for indicating non-metrological information (e.g., PLU codes). If non-metrological numerical values are placed in the "weight" display or in the "total price" display, they could be misleading and interpreted as valid weight.

The Maryland NTEP laboratory recommended the following additional language for NCWM Publication 14, Section 27-Price Computing Scales:

27.X.	Dedicated displays (used only for the display of the specific information) are provided for the total price and the quantity information. (Values that could be interpreted as a weight shall not be displayed in the weight display window.)	**Yes ☐ No ☐ N/A ☐**
27.X.	The placement of displays shall be mathematically logical (net weight x unit price = total price) when reading from left to right (or top to bottom).	**Yes ☐ No ☐ N/A ☐**
27.X.	When a computing scale is setup in a mode for indirect sales to the customer, information that would not be available in the direct sales mode **is not** displayed on the customer side.	**Yes ☐ No ☐ N/A ☐**

The following areas of R76-Non-automatic Weighing Instruments were used in developing the additional requirements.

OIML R76 states:

4.4.4. Multiple use of indicating devices

Indications other than primary indications may be displayed in the indicating device, provided that,

- the appropriate unit of measurement, or symbol thereof, or a special sign identifies quantities other than weight values,
- weight values that are not weighing results shall be clearly identified, or they may be displayed only temporarily on manual command and shall not be printed.

No restrictions apply if the weighing mode is made inoperative by a special command.

4.15.4. Special applications of a price-computing instrument

Only if all transactions performed by the instrument or by connected peripherals are printed on a ticket or label intended for the customer, a price-computing instrument may perform additional functions that facilitate trade and management. These functions shall not lead to confusion about the results of weighing and price computing.

Other operations or indications not covered by the following provisions may be performed, provided that no indication that could possibly be misunderstood as a primary indication is presented to the customer.

Discussion: The Maryland NTEP laboratory reported on a computing scale (see picture below) that used the "Total Price" display to indicate the product code prior to a load placed on the scale and a calculation of total price. If the product code was indicated in the "Total Price" display while a load was already on the scale, a customer may believe that the product code number is the total price to pay.

Many of the sector members did not believe the example provided by the Maryland laboratory was a problem since the product code did not use a decimal point similar to a representation of money.

Recommendation: **The Sector believed the example provided by the Maryland NTEP laboratory did not demonstrate a problem. It also believed the proposed language could cause additional confusion. The submitter agreed to develop language to further its case and submit such to the Sector for discussion and ballot approval. If no consensus can be reached on the ballot, the item will be carried over to the next meeting of the Weighing Sector.**

17. Handbook 44 - Location of Marking for "Capacity x d" on Scales

Source: NTEP Participating Laboratories

Background: NIST Handbook 44, Scales Code, Table S.6.3.b., Note 3 states:

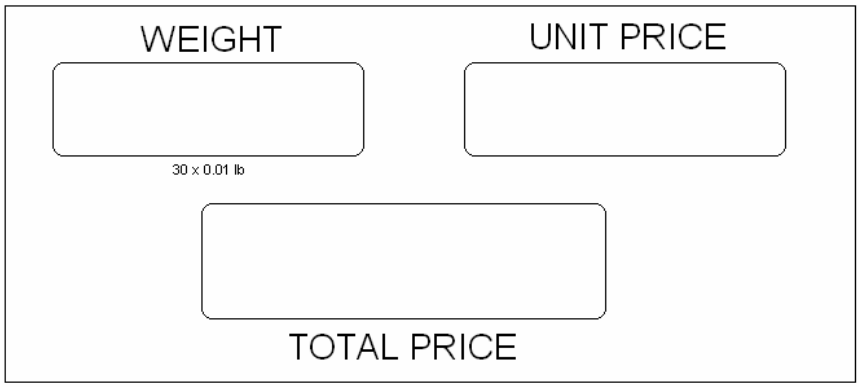
> The nominal capacity and the value of the scale division shall be shown together (e.g., 50 000 x 5 kg, 100 000 x 10 lb, 15 x 0.005 kg, or 30 x 0.01 lb) adjacent to the weight display when the nominal capacity and the value of the scale division are not readily apparent. Each scale division value or weight unit shall be marked on multiple range or multiple-interval scales.

There have been discussions with the NTEP labs on their interpretation of the location requirement for marking "capacity x d." Specifically, what is meant by the term "adjacent"? This item has been addressed several times in the past and the Weighing Sector and NCWM Executive Committee have been unable to develop a solution. The June 1990 NTETC Weighing Sector Report stated:

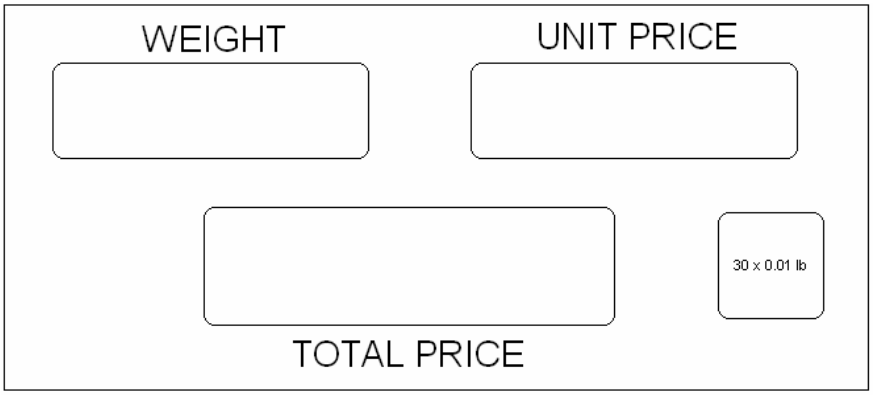
> "The Committee was unable to be more definitive and maintained its opinion that the NTEP Laboratory's judgment remains the best solution. In cases of extreme disagreement, the appeal process (to the Board of Governors) is the avenue to resolve."

Attempts to interpret this requirement continue to cause conflict between NTEP labs and manufacturers. The NTEP labs maintain that the marking shall be next to the weight display on the face of a scale, but devices are being submitted with the marking located elsewhere on the face of the scale. (See the following examples.)

Example 1 - Correct



Example 2 - Incorrect



NOTE: By amending Handbook 44 as proposed, both examples would be acceptable.

The NTEP laboratories agree with the following premises:

- Example 2 is incorrect according to Handbook 44 because the marking does not appear *adjacent* to the weight display *(Tech Advisor comment: Additionally, the markings are not placed as close as practical to the weight indication as required in G-S.5.2.4. Values).*
- The operator is familiar with the device and does not rely heavily on the location of the marking for capacity x division.
- The customer rarely understands the marking or its significance.
- The marking in both examples is conspicuous enough for the inspector and service technician who rely most heavily on the information.
- Both examples in the attachment would be acceptable if the requirement could be amended to allow for the marking to simply be placed conspicuously on the face of the indicating portion of the scale. *(Tech advisor comment: The current Scales Code requirements are not in conflict with the General Code paragraph G-S.5.2.4. Values, however, the proposal submitted by the NTEP laboratories does create a conflict since the markings may not be placed as close as practical to the indications.)*

NCWM Publication 14 DES Section 2.13. states:

~~2.13. The nominal capacity by minimum scale division shall be clearly and conspicuously marked adjacent to the weight display. (Acceptable location depends on conspicuousness.)~~

This statement implies, and the NTEP laboratories concur, that "conspicuousness" should be the primary concern, not "adjacent." But until "adjacent" is removed from the requirement, NTEP is tied to that portion of the requirement as well.

The NIST technical advisor also included language in OIML R76 for Non-automatic Weighing Instruments paragraph 7.1.4 Presentation of descriptive markings. The NIST technical advisor believes the recommendations in R76 satisfy the intent of the participating laboratories' recommendations and does not require a third definition of "face" in NIST Handbook 44, Appendix D, as follows:

> 7.1.4. Presentation of descriptive markings
> The descriptive markings shall be indelible and of a size, shape and clarity allowing easy reading. They shall be grouped together in a clearly visible place either on a descriptive plate fixed to an instrument or on a part of the instrument itself.
> The markings:
> Max …
> Min …
> e …
> and d if d does not equal e
> shall also be shown near the display of the result if they are not already located there *(Tech advisor note: The markings may need to be repeated near the result if they are on a plate or location that is not near the weight display, or if the markings are on separable elements).* It shall be possible to seal the plate bearing the descriptive markings unless its removal will result in its destruction. If the data plate is sealed, it shall be possible to apply a control mark to it.

The participating laboratories asked the Nebraska NTEP laboratory to develop a proposal to amend Scales Code Table S.6.3.b., Note 3 and add a new definition of "face" based upon discussions of this item during the 2004 meeting of the NTEP laboratories.

Discussion/Recommendation: **The Weighing Sector reviewed the background information and the proposed amendments to Handbook 44 from the NTEP laboratories and the NIST technical advisor. The Sector agreed to forward to the regional and NCWM S&T Committees the following amended recommendation:**

> **The nominal capacity** ***and value of the scale division shall be shown together (e.g., ~~50 000 x 5 kg, 100 000 x 10 lb,~~ 15 x 0.005 k, or 30 x 0.01 lb) ~~adjacent to the weight display~~ in a clear and conspicuous manner and be readily apparent when viewing the reading face of the scale indicator unless ~~when the nominal capacity and the value of the scale division are not immediately~~ it is already apparent by the design of the device. Each scale division value or weight unit shall be marked on multiple range or multi-interval scales.***
> ***[Nonretroactive as of January 1, 1983]***
> **(Amended January 1, 200X)**

18. CLC Type Evaluation Tests on Railway Track/Vehicle Scales – Technical Policy

Source: Brechbuhler Scales Inc.

Background: During the 1998 NTETC Weighing Sector meeting, the Sector agreed the GIPSA (Grain Inspection Packers and Stockyards Administration) test car may be used to satisfy testing requirements for CLC and section capacity. However, there was no recommendation regarding the addition of vehicle weighing applications for existing Certificates of Conformance (CC) that were certified for only railway track applications. Brechbuhler Scales believes that vehicle weighing applications (e = 20 lb) can be added on a railway track scale NTEP CC without additional testing, and that the CLC rating can be established based upon previous section tests using the GIPSA test car (or other railroad test cars and additional test weights used for the evaluation). Brechbuhler Scales states that there is no benefit for performing additional CLC tests to include the vehicle weighing application to an existing railway track scale CC.

It should be noted that existing NTEP technical policy A. Models to be submitted for Evaluation, paragraph 8(a) Weighing Systems, Scales or Weighing/Load-receiving Elements Greater than 30 000 lb Capacity states that the scale division **e** will be limited to the value of **e** that was originally evaluated and listed on the CC.

Brechbuhler Scales requested that vehicle weighing applications (e = 20 lb) be added to existing railway track scale CCs (e = 50 lb) that have been designed to Cooper E-80 standards and tested using the GISPA test car (or other railroad test cars and additional test weights).

Discussion: The Sector reviewed the background information and discussed amending the appropriate NTEP Technical Policy. Brechbuhler Scales also provided additional history of the item. The railroad track scale in question was originally submitted as a combination vehicle/railroad track scale. However, the user changed the application such that vehicles could not drive onto the scale, therefore, the device was evaluated and a Certificate of Conformance was issued for railroad track applications only. On a later installation, a CLC test was performed. Brechbuhler Scales questions the value of the additional evaluation.

Some of the Sector members support additional testing to verify that a railroad track scale can accurately weigh at lower capacities used by highway vehicles. They report frequent problems when the scale is calibrated for railroad use and is inaccurate for vehicle weighing. Additionally, the traffic patterns are different between highway vehicles and railroad cars. Highway vehicles frequently travel along the side of the scale where railroad cars travel on the rails, which are typically located on the main girders of the weighbridge. These Sector members believed that a scale designed for railroad cars might not have been designed to adequately support highway vehicles along the sides of the scale.

The manufacturers stated that the calibration problems encountered during verifications are the result of improper use and maintenance of railway track scales.

Other Sector members believe that CLC testing can be eliminated on combination vehicle/railroad track scales because of the amount of weights placed on the scale. Dave Quinn reported that he is working on a white paper that will help clarify the CLC issue.

Recommendation: **The Weighing Sector did not reach a consensus on this item. Brechbuhler Scales stated that they would develop and submit a proposal for testing for railroad track scales that will include procedures to include highway vehicle applications.**

This item will be carried over to the 2005 meeting of the Weighing Sector.

19. Display of a Negative Balance Condition and Required Markings

Source: NTEP Participating Laboratories

Background: One of the NTEP laboratories has reported that it has seen not-built-for-purpose primary weight displays in which blanking the weight display is used to indicate a behind zero condition. The problem occurs when all of the required G-S.1. Identification markings also blank. The scale is in an error condition, is still functioning in a normal operational mode as it was designed to operate (display an error code within specific parameters), and is not in a screen saver or sleep mode. Blanking the required markings is not necessary and would give the false impression that the weight display feature is not enabled. Primary indications must be clear and definite. G.S.1. information must be permanently marked.

The laboratories recommended adding the following statement to the end of Publication 14, Digital Electronic Scales, Section 18.2 –Blanking the Display:

> <u>When blanking a primary weight display with live on screen G-S.1. and/or S.6.3. markings, the required markings must not blank.</u>

The laboratories also recommended:

- adding language to Section 5- Identification in the ECRS checklist Section 18. Zero Indication;
- similar wording be added to Section 5 of the ECRS checklist;

- group existing paragraphs 5.6. thru 5.9. under a new Section 5.7. to clarify that paragraphs above the phrase "For not-built-for-purpose, software-based devices, the following shall apply:" may be applicable to all ECRs (including not-built-for-purpose, software-based devices).

Discussion/Recommendation: ***The Weighing Sector reviewed and discussed the proposed changes to Publication 14. A question was asked if the use of "pop-up" displays or menus that temporarily blocked the required information was a problem. The Sector agreed there should be no issues with the "pop-up" feature since this is a temporary condition during normal operation; a transaction cannot be conducted while the temporary feature is operational, and the customer is able to review the entire transaction (zero-load, weight, and price calculations if applicable).***

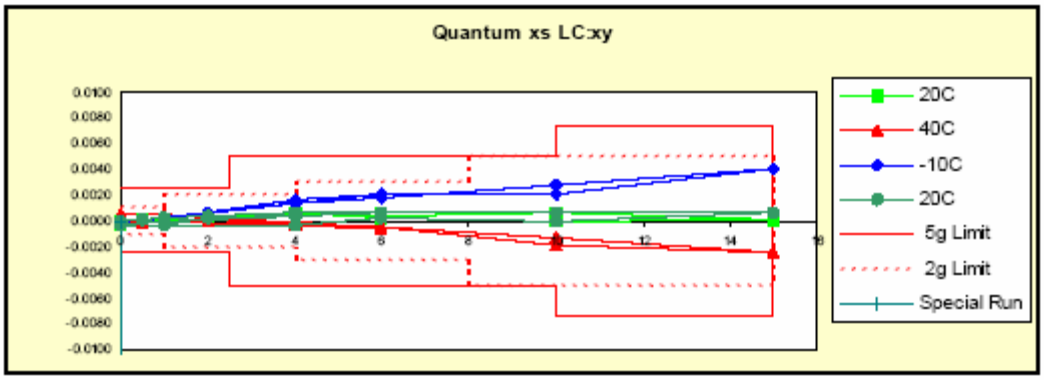
The Sector agreed to recommend that the proposed language, as shown in Appendix A - Agenda Item 19, be added to NCWM Publication 14.

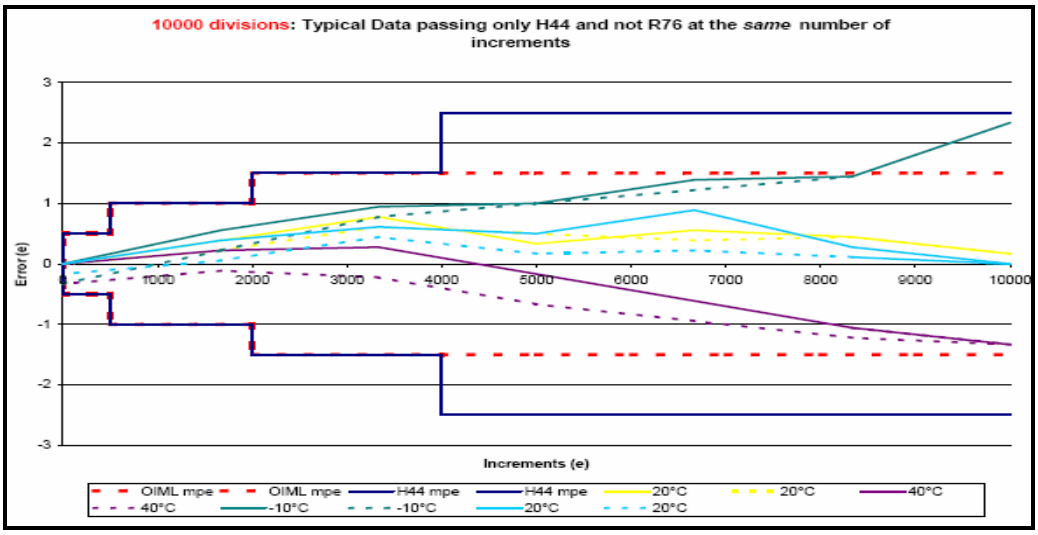
20. Dropping the 4th Step in Class III and IIII Tolerances

Source: NIST Technical Advisor

Background: During the August 2003 meeting of the U.S. National Work Group (USNWG) for R76 Non-Automatic Weighing Instruments, the group discussed the difference in the tolerance for Class III and IIII weighing instruments. The USNWG confirmed that the original intent of the step tolerances was to provide a relationship between scale accuracy and resolution. They further recommended that Handbook 44 Class III and Class IIII tolerances be aligned with OIML R76. The manufacturers present during the meeting reported that they essentially build identically performing instruments and load cells for both national and international markets. Additional background information is presented in Appendix A.

Since the August 2004 meeting Nigel Mills and Gary Lameris of the Hobart Corporation provided the following additional "production data" comparing the different Class III tolerances:





The charts indicate that the above production scales would comply with Handbook 44 linearity tolerances up to 10 000 e and OIML R76 tolerances up to approximately 7000 e. Hobart Corporation also reported` that many scales and load cells would have difficulty complying with the temperature effect on zero with an n_{max} greater than 5000 e in both Handbook 44 and OIML R76.

The Sector was requested to review the background information and discuss submitting the following proposal to amend Scales Code Table 6 Maintenance Tolerances as follows:

Table 6.
Maintenance Tolerances
(All values in this table are in verification scale divisions e)

Tolerance in verification scale divisions e				
	1	**2**	**3**	~~**5**~~
Class	**Test Load**			
I	0 - 50 000	50 001 - 200 000	200 001 +	
II	0 - 5 000	5 001 - 20 000	20 001 +	
III	0 - 500	501 - 2 000	2 001 + ~~4 000~~	~~4 001 +~~
IIII	0 - 50	51 - 200	201 + ~~400~~	~~401 +~~
III L	0 - 500	501 - 1 000	(Add 1d for each additional 500 d or fraction thereof)	

The NIST technical advisor requested that the Sector discuss Accuracy Class III L and offer a technical justification to retain the Handbook 44 Class III L tolerance and propose a similar tolerance be incorporated in OIML R76 or recommend that Class III L be removed from Handbook 44, and if so, should it e non-retroactive? The Class III L tolerance structure in Handbook 44 deviates from the intent step tolerances since there is little relation of the value of the scale division (e.g., e = 20 lb resolution) to the accuracy required (i.e., ± 8 e at 80 000 lb maintenance tolerance). The tolerance values, zero-tracking limit and motion detection requirements in Handbook 44 are roughly equivalent to an R76 instrument when e = 50 lb.

Discussion/Recommendation: **The Weighing Sector withdrew this item from its agenda since the proposal did not relate to problems encountered with Publication 14 type evaluation procedures. The Sector recommended that the proposal submitted by NIST and the U.S. National Work Group be made an information/developmental item if it were submitted to the regional weights and measures associations and the NCWM S&T Committee.**

Members of the Weighing Sector offered the following comments:

The elimination of the fourth step in Class III weighing devices may encourage the increased usage of multiple range scales. This by itself is desirable, however, NTEP should consider manufacturers' concerns with existing Publication 14 interpretations of Handbook 44 that require the range or interval in use be adequately identified. A problem arises when the change in minimum interval does not change the number of significant digits in the display (frequently used to adequately define which range is in use).

Additionally, the proposal may have an impact on Class III separable weighing/load-receiving elements and load cells and the maximum permissible errors allowed during type evaluation since the apportionment of errors in Handbook 44 is different than OIML R76 and R60.

There was no time available at the end of the meeting to discuss Class III L scales and load cells.

21. Cash Acceptors or Card-activated Systems

Source: NTEP Participating Laboratories

Background: During the 2001 Weighing Sector Meeting, the cash/coin acceptor capability for self-service ECR-POS systems was discussed.

The Sector concluded that the participating labs would use the draft procedure on a one-year trial basis and report back to the NIST technical advisor with their comments. Additionally, the NIST technical advisor would attempt to contact the affected manufacturers of self-service checkout systems interfaced with scales for their comments on the proposed checklist addition.

The NTEP laboratories reported no problems with the draft procedures and agreed to forward them to the Weighing Sector for review and comment. The Sector should also consider if the draft procedures are needed or suitable for Digital Electronic Scales checklist. The NIST technical advisor was requested to send the draft procedures to CC holders of self-checkout POS systems. Unfortunately, this has not been done yet.

Discussion/Recommendation: **The Sector agreed to recommend the procedures, as shown in Appendix A, agenda Item 21, be added to Publication 14 ECRS.**

22. Tare on a Multiple Range Scales

Source: **NTEP Participating Laboratories:**

Background: NCWM Publication 14, Section 33 is not clear on what is expected of tare on a multiple range scale when switching from a lower weighing range to a higher weighing range. Section 33 states: "On a multiple range instrument, a tare value may only be transferred from one weighing range to another one with a larger verification scale interval but shall then be rounded in the upward direction to the latter verification interval." It is not clear if this means the tare must always be rounded to a higher value, or if tare can be rounded to the resolution of the higher range.

During the 2004 NTEP Laboratory meeting in Ottawa Canada, there was discussion about the rounding of tare to zero when the tare value was less than 0.5 e. The Ohio NTEP laboratory believes that rounding of tare should follow normal rounding rules, except that the scale can never round tare to zero and maintain the scale in Net mode, indicating that zero Tare is entered. Don Onwiler, Nebraska, stated that Nebraska's policy is to consider tare less than 0.5 e to be a product without tare material. Canada allows tare to round to the nearest division, including zero. The labs (except NE) agreed to submit the Ohio proposal as amended by the NTEP labs to the Sector with changes noted during the discussion. The tare value can round down to the nearest scale division except when the nearest scale division is zero. Then tare has to round up.

The NTEP laboratories submitted the following amendments to NCWM Publication 14 as indicated in the highlighted text.

33. Multiple Range Scales

A multiple range scale is an instrument having two or more weighing ranges with different maximum capacities and different scale intervals for the same load receptor, each range extending from zero to its maximum capacity. The weighing ranges may be either manually or automatically selected. Each weighing range is considered to be an individual scale and evaluated accordingly.

The capacity and verification scale division must be conspicuously marked near the weight display. The range in use must be clearly indicated. If a scale has a decimal point and a different number of decimal places in each weighing range, the position of the decimal point and the number of digits following is an adequate definition of the weighing range in use. If the weighing ranges do not utilize a decimal point and differing numbers of decimal places (e.g., scale divisions are 20 lb, 50 lb, and 100 lb), another method such as an external range indicator must be provided to indicate the weighing range in use.

Whenever gross and tare weights fall in different weighing ranges so that the scale divisions for the gross and tare weights differ, the net weight must agree mathematically with the gross and tare weights that are indicated or recorded (i.e., net = gross - tare).

On a multiple range instrument, a tare value may only be transferred from one weighing range to another with a larger verification scale interval. When transferring a tare value from a lower range to a higher range, the tare value should be rounded appropriately to the latter verification interval with care taken to prevent a zero tare value. ~~but shall then be rounded in the upward direction to the latter verification interval~~.

Examples: (Assuming an interval value for range 1 is 2 lbs and an interval value for range 2 is 5 lbs.)

- Tare value entered in range 1 is 8 lbs – when switching to range 2, the tare value would become 10 lbs.
- Tare value entered in range 1 is 6 lbs – when switching to range 2, the tare value would become 5 lbs.
- Tare value entered in range 1 is 2 lbs – when switching to range 2, the tare value would become 5 lbs ~~or the tare value may be cleared and the scale returned to the gross mode.~~ *(Strikeout was suggested at the spring meeting of the NTEP labs)*
- In examples 1 and 2 above, the tare value is rounded appropriately to realize the smallest error introduced by rounding. ~~In example 3, appropriate rounding could create a zero tare condition. In this example, the tare value would be rounded up or cleared.~~ *(Strikeout was suggested at the spring meeting of the NTEP labs)*

33.1. The range in use shall be conspicuously indicated. **Yes** ☐ **No** ☐ **N/A**

33.2. Ranges may be changed:

33.2.1. Manually **Yes** ☐ **No** ☐ **N/A**

33.2.1.1. from a smaller to greater range at any load. **Yes** ☐ **No** ☐ **N/A**

33.2.1.2. from a greater to a smaller weighing range when there is no load on the load receptor and the indication is zero or at a negative net value; the tare operation shall either be canceled or revert to the original value and zero shall be set, both automatically. **Yes** ☐ **No** ☐ **N/A**

33.2.2. Automatically

33.2.2.1. from a smaller to the following greater weighing range when the load exceeds the maximum gross weight of the range being operative. **Yes** ☐ **No** ☐ **N/A**

33.2.2.2. only from a greater to the smallest weighing range when there is no load on the load receptor and the indication is zero or at a negative net value; the tare operation shall either be canceled or revert to the original value and zero shall be set, both automatically. **Yes** ☐ **No** ☐ **N/A**

33.3. Devices with a tare capability must indicate and record values that satisfy the equation: net = gross – tare. ~~and~~ When automatically changing to a higher range from a lower range, the ~~round the~~ tare value shall be rounded ~~up~~ to the appropriate verification interval for the higher range. Care shall be taken to prevent a zero tare value. ~~larger division size when entering the larger division. Example, 2 g changes to 5 g not 0 g.~~ **Yes** ☐ **No** ☐ **N/A**

33.4. Keyboard tare entries must be consistent with the displayed scale division. **Yes** ☐ **No** ☐ **N/A**

33.5. For manual multiple range scales, the maximum weight value indicated in each range must not exceed:

33.5.1. 105 % of the rated capacity for the weighing range, or **Yes** ☐ **No** ☐ **N/A**

33.5.2. maximum capacity plus 9 d. **Yes** ☐ **No** ☐ **N/A**

33.6. For all weighing ranges, e must equal d. **Yes** ☐ **No** ☐ **N/A**

33.7. On a multiple range instrument, the deviation on returning to zero from Max shall not exceed 0.5 e. Furthermore, for automatic range changing devices, after returning to zero from any load greater than Max and immediately after switching to the lowest weighing range, the indication near zero shall not vary by more than **e** during the following 5 minutes. **Yes** ☐ **No** ☐ **N/A**

Discussion: Several Weighing Sector members stated that forcing a user to round tare up forces them to give away product. Other Sector members responded that they tell the users that items are to be sold on the basis of net weight, customers are not expected to pay for the package material (tare), and that costs associated with tare are part of the cost associated with doing business. Therefore, the unit price of the commodity should be adjusted accordingly. Another Sector member reported that actual quantities of products and tare often fall more or less randomly between indicated amounts and rounding to the nearer value and should balance out over a number of transactions.

It was also reported that Publication 14 allows for tare to be rounded to the nearest scale division for single range scales (DES 2004 paragraph 47.2.2.), but forces tare to be rounded to the next higher division for multiple range scales (DES 2004 paragraph 32.3.). Members of the Sector questioned why the rounding of tare is treated differently between the two types of scales and whether or not Handbook 44 supports the Publication 14 requirements in paragraph 32.3.

Some of the manufacturers stated that they recommend to their customers with pre-packaging scales that they round tare up to the next higher division to reduce the possibility of packages being rejected by weights and measures officials.

Recommendation: **The Sector did not reach consensus on this item. This issue will be carried over to the next meetings of the NTEP laboratories and NTETC Weighing Sector.**

23. Performance and Permanence Tests for Railway Track Scales Used to Weigh Statically

Source: NTEP Participating Laboratories

Background: The 2004 edition of NCWM Publication 14 states the following:

68. Performance and Permanence Tests for Railway Track Scales Used to Weigh Statically

68.7. Permanence Test

The permanence test shall be conducted from 20 to 30 days after successful completion of the initial performance test. It is recommended that the performance tests described above be repeated. However, if the original test car is not available, the test may be conducted to the extent possible with at least two railroad test weight cars. The results of this test must be within acceptance tolerance[13]. If the device does not meet these tolerance limits, the entire test must be repeated.

(footnote 13) If the subsequent performance test cannot be completed within 30 days because of the unavailability of test cars, maintenance tolerance will be applied.

The NTEP laboratories agreed the wording for this and all permanence testing should be changed to say a "minimum of 20 days" (not stating a maximum). Additionally, Footnote 13 should be removed and acceptance tolerances should be applied for all type evaluation testing, except where absolute values are to be used.

Discussion: The Weighing Sector reviewed the summary of the June 1992 meeting of the NTETC Weighing Sector that addressed the permanence test for railway track scales. The Sector recognized the language in Publication 14, Section 68, footnote 13 is not supported by Handbook 44 paragraph G-T.1. Acceptance Tolerances. However, manufacturers are concerned with eliminating the footnote since it is difficult to perform the subsequent permanence test within the 20- to 30-day time period. They are also concerned that the use (abuse) of these scales makes it difficult for them to maintain acceptance tolerances for periods significantly beyond the 30 days. Additionally, it is costly for the NTEP applicant if the scale fails the permanence test and they have to discontinue the evaluation until a GISPA type test car can return to the site or if they have to pay the railroads to deliver two railroad test cars to the test site.

Recommendation: **The Sector agreed to recommend the requirement that the subsequent permanence test be "conducted 20 to 30 days after the successful completion of the initial permanence test" be changed to "after a minimum of 20 days…."**

However, there was no consensus or recommendation for the minimum number of weighments between tests or the deletion of footnote 13.

The NIST technical advisor and Ed Luthy (Brechbuhler Scales) volunteered to submit this issue to the railroads during the October 2004 meeting of AREMA Committee 34-Scales (American Railway Engineering and Maintenance of Way Association).

This item will be carried over for the 2005 meeting of the NTETC Weighing Sector.

24. Next Sector Meeting

Discussion/Recommendation: ***The normal rotation of laboratories for the next Weighing Sector meeting is at the Ohio NTEP participating laboratory. However, the Sector recommends that the meeting be held in conjunction with the Western Weights and Measures Association regional meeting which will be held in Phoenix, AZ, in September 2005.***

Appendix A - Recommendations for Amendments to Publication 14

Agenda Item 1 (a)

17. Manual Weights

Code References: G-S.2. and S.1.12

The following requirements apply to scales being used for direct sales to the customer, unattended scales, or customer-operated scales and scales used in weighmaster applications. These requirements do not apply to scales and weighing systems used to generate labels for standard net content packages.

17.1. Manual entries of gross or net weights are permitted when being used for direct sales ~~for use~~ in the following applications only: **Yes** ☐ **No** ☐ **N/A** ☐

- ❑ ~~(1)~~POS systems interfaced with a scale when giving credit for a weighed item;

~~(2) when generating labels for standard weight packages;~~

- ❑ (~~3~~) postal and package shipping scales when generating manifests for pick-up at a later time; ~~and~~
- ❑ (~~4~~) on livestock scales and vehicle scales to correct erroneous tickets; and
- ❑ (~~5~~) when an item is pre-weighed on a legal-for-trade scale and marked with the correct net weight.

17.2. The scale shall ~~must~~ be at gross-load or net zero and the scale indication shall ~~must~~ be at zero ~~in the gross weight display mode~~ before manual weight entries are permitted (except for scales being used not-for-direct sales to the customer) and; **Yes** ☐ **No** ☐ **N/A** ☐

17.3. Recorded weight values shall be identified as MAN WT, MANUAL WT, MAN WEIGHT, or similar statement. R~~r~~ecorded manual gross or net weight values must be adequately defined so it is clear that the ~~gross~~ weight values are manual gross or net weight entries. ~~Recorded weight values must be identified as MAN WT, MANUAL WT, MAN WEIGHT, or similar statement.~~ **Yes** ☐ **No** ☐ **N/A** ☐

The use of a symbol to identify multiple manual weight entries is permitted, provided the symbol is defined on the same page on which the manual weight entries appear and the definition of the symbol is automatically printed by the recording element as part of the document.

17.4. Scales that can be used for both direct and indirect scales to the customer by the use of an external button or switch to issue prepack random weights or standard pack labels, the manual weight capability shall only be operable in the prepack and unit price) or similar modes of operation that retain tare (and unit price) information for labeling multiple packages. **Yes** ☐ **No** ☐ **N/A** ☐

17.5. Manual tare entries shall not interact with a feature that compares one weight value to another to identify the larger weight as the gross weight. **Yes** ☐ **No** ☐ **N/A** ☐

17.6 Manual tickets may be entered from scales that are not interfaced (physically connected) to the system provided it is clearly stated on the ticket. **Yes** ☐ **No** ☐ **N/A** ☐
NOTE: *The use of a "hot key" or other means to selectively interrupt communication with the scale is not permitted.*

17.7. In the normal weighing mode, when scale to computer communications exists, manual gross and net weights cannot be entered for a new (not voided) ticket. Manual gross and tare weights can be entered for new tickets if scale communication is lost. Scales reading errors such as motion, below zero, over capacity, or wrong display units are not considered a loss of communication with the scale. **Yes** ☐ **No** ☐ **N/A** ☐

A conspicuous message must be printed on the ticket that this is a manually generated weigh-ticket.

Agenda Item 1 (b)

2.21. The section capacity of a railway track and livestock scale-indicating element shall be marked on or adjacent to the identification badge on the indicating element. The section capacity shall be prefaced by the words "Section Capacity" or an abbreviation of that term. Abbreviations shall be "Sec Cap" or "Sec C." All capital letters and periods may be used. **Yes** ☐ **No** ☐ **N/A** ☐

5.1. The section capacity of a railway track and livestock scale shall be marked on or adjacent to the identification badge on the indicating element. The section capacity shall be prefaced by the words "Section Capacity" or an abbreviatin of that term. Abbreviations shall be "Sec Cap" or "Sec C." All capital letters and periods may be used. **Yes** ☐ **No** ☐ **N/A** ☐

5.4. Combination vehicle/railway track and combination vehicle/livestock scales shall be marked with (1) the nominal capacity and CLC for vehicle weighing, and (2) the nominal capacity and section capacity for railway and livestock weighing. The e_{min} for both vehicle weighing, ~~and~~ railway, and livestock weighing shall also be marked. **Yes** ☐ **No** ☐ **N/A** ☐

NOTE: *Combination scales (vehicle/railway track and vehicle/livestock) shall be marked with all required information.*

75. List of Acceptable Abbreviations/Symbols

Weighing and Indicating Elements:	Accuracy Class	I, II, III, III L, IIII ~~Or~~ or Symbols enclosed in an ellipse such as:	l, ll, lll, lll L, llll, 1, 2, 3, 3 L, 4
	maximum number of scale divisions	n_{max}	
	Section Capacity	Sec C or Sec Cap	

Agenda Item 1 (d)

43. Discrimination and Zone of Uncertainty

Code Reference: T.N.7.1 and T.N.7.2.

The zone of uncertainty for digital indications must be <= 0.3 d. This test shall be conducted under controlled conditions in which environmental factors are reduced to the extent that they will not affect the results obtained.

43.1. Zone of Uncertainty Test for digital indications: Record the width of the zone of uncertainty as a decimal fraction of a scale division.

43.1.1. Near Zero. **Yes ☐ No ☐ N/A ☐**

AVOIRDUPOIS_____d
METRIC _____d
OTHER UNITS (Identify units_____)_____ d

43.1.2. Near Capacity. **Yes ☐ No ☐ N/A ☐**

AVOIRDUPOIS_____d
METRIC _____d
OTHER UNITS (Identify units_____)_____ d

43.2. Discrimination Test. The following tests shall be performed within 10 e of zero and at the maximum test load.

43.2.1. Digital Indications – Decreasing-load Test

Gently place the error weights in 1/10 e increments until the indication (I) increases by 1 displayed division (I + 1). Gently remove a test load equivalent to 1.4 e. This shall cause a decrease in the indicated or recorded value of 2 e.

43.2.1.1. At or near zero (zero plus 10 e) **Yes ☐ No ☐ N/A ☐**

43.2.1.2. At maximum test load. **Yes ☐ No ☐ N/A ☐**

43.2.2 Digital Indications –Increasing-load Test

Place error weights on the load receptor at least 10 times 1/10 e. Gently remove the error weights in 1/10 e increments until the indication (I) decreases by 1 displayed division (I-1). Gently add a test load equivalent to 1.4 e. This shall cause an increase in the indicated or recorded value of 2 e.

43.2.2.1. At or near zero (zero plus 10 e) **Yes ☐ No ☐ N/A ☐**

43.2.2.2. At maximum test load. **Yes ☐ No ☐ N/A ☐**

43.2.3. Automatic Analog Indications

A test load equivalent to 1.4 e placed gently on or removed from the load receptor while the instrument is at equilibrium shall cause the change in equilibrium in the indication of at least 1.0 e.

43.2.3.1. At or near zero **Yes ☐ No ☐ N/A ☐**

43.2.3.2. At maximum test load. **Yes ☐ No ☐ N/A ☐**

63.4. Subsequent Type Evaluation (Field) Permanence Test (Applicable for instruments above 2000 lb capacity, or instruments, because of their size, that can not be accommodated by the laboratory.)

A minimum of two increasing-load, two decreasing-load, and two shift (or a combination of shift and corner) tests, are to be conducted after a minimum of 20 days after the initial tests. The scales are to be tested to capacity using certified

tests weights. If the test results are at or near acceptance tolerance limits, at least one more set of tests should be conducted immediately to verify the test results and determine device repeatability. If scale repeatability is not good (e.g., > 0.5d), conduct additional tests.

Repeat width-of-zero, zone of uncertainty, sensitivity, and discrimination tests near zero (outside the range of the AZSM) and at or near capacity on the subsequent tests.

69.1.1. Discrimination test at zero-load or near zero outside the range of the AZSM, and at scale capacity or the maximum test load, whichever is less.

69.4.1. Discrimination test at zero-load or near zero outside the range of the AZSM, and at scale capacity or the maximum test load, whichever is less.

Agenda Item 1 (e)

50. Performance and Permanence Tests ~~for Counter (Bench) Scales (Including Computing Scales)~~

~~50.1. Increasing Load Test~~

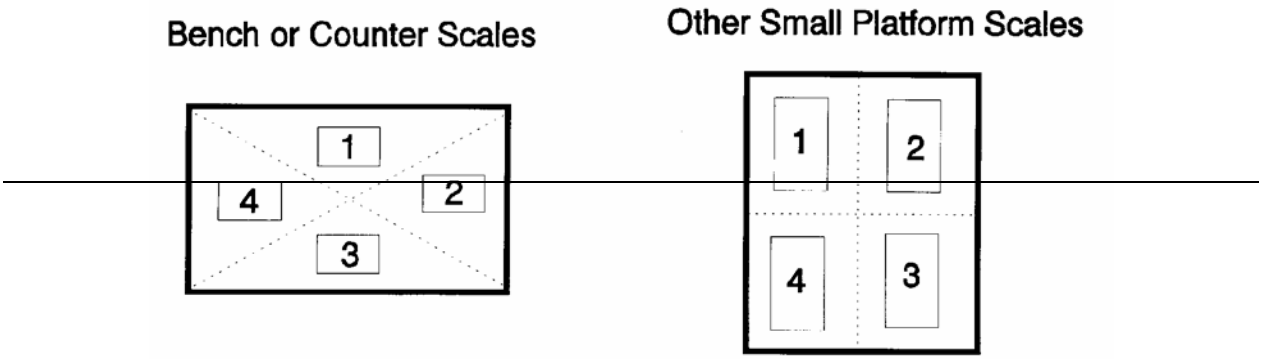
~~Because of the ease of testing computing scales, it is recommended that the increasing load test for computing scales (approximately 30 lb capacity) consist of loads of 0.05, 0.45, and 0.95 lb, at 1 lb intervals thereafter to one-half capacity, and at 2 lb intervals from one-half capacity to capacity. Larger capacity scales should be tested at 1 lb intervals to 5 lb and in convenient steps to capacity, with a minimum of eight additional test loads. These are minimum tests.~~

~~50.2. Decreasing Load Test~~

~~The minimum decreasing load test is at a test load of one-half capacity after the scale has been loaded to capacity.~~

~~50.3. Shift Test~~

~~Test with test loads equal to one-half capacity as specified in N.1.3.1. and at test positions as illustrated below:~~



50.1. Performance Test (Weigh-Labelers)

Note:

- If the device is designed for use in static (non-automatic) weighing, it shall be tested statically using mass standards.

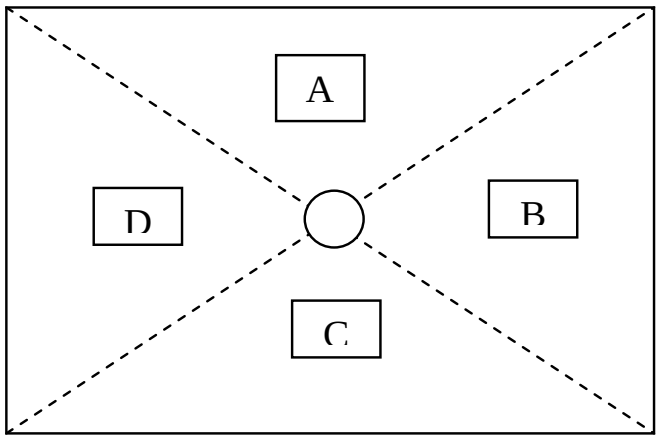
- If the device is designed for only automatic (dynamic or static) weighing, it shall only be tested in the automatic mode of operation.

50.1.1. **Non-automatic (Static) Tests.**

50.1.1.1 **Increasing-Load Test. -** The increasing-load test shall be conducted with the test loads approximately centered on the load-receiving element of the scale.

50.1.1.2. **Decreasing-Load Test. -** The decreasing-load test shall be conducted with the test loads approximately centered on the load-receiving element of the scale.

50.1.1.3. **Shift Test. -** To determine the effect of off-center loading, a test load equal to one-half (½) maximum capacity shall be placed in the center of each of the four points equidistant between the center and front, left, back, and right edges of the load receiver.



50.1.1.2. **Discrimination Test. -** A discrimination test shall be conducted with the weighing device in equilibrium at zero load and at maximum test load, and under controlled conditions in which environmental factors are reduced to the extent that they will not affect the results obtained. This test is conducted from just below the lower edge of the zone of uncertainty for increasing-load tests, or from just above the upper edge of the zone of uncertainty for decreasing-load tests.

50.1.1.5. **Zero-Load Balance Change. -** A zero-load balance change test shall be conducted on all automatic-weighing systems after the removal of any test load. The zero-load balance should not change by more than the minimum tolerance applicable. (Also see G-UR.4.2.)

50.1.1.6. **Influence Factor Testing. -** Influence factor testing shall be conducted.

50.1.2. **Automatic (dynamic or static) Tests. -** The device shall be tested at the highest speed for each weight range using standardized test pucks or packages. Test runs shall be conducted using four test loads as described in Table N.3.2. Each test load shall be run a minimum of 10 consecutive times.

Table N.3.2. Test Loads
At or near minimum capacity
At or near maximum capacity
At two (2) critical points between minimum and maximum capacity
Test may be conducted at other loads if the device is intended for use at other specific capacities

50.1.2.1 **Shift Test. -** To determine the effect of eccentric loading, for devices without a means to align packages, a test load equal to one-third (1/3) maximum capacity shall be passed over the load receiver or transport belt (1) halfway between the center and front edge, and (2) halfway between the center and back edge.

1)
(2)

50.2. Performance Test (Automatic Checkweighers)

50.2.1. **Non-automatic (static) Tests. -** If the scale is designed to operate statically during normal user operation, it shall be tested statically using the applicable weigh-labeler requirements.

50.2.2. **Automatic (dynamic or static) Tests. -** The device shall be tested at the highest speed in each weight range using standardized test pucks or packages. Test runs shall be conducted using four test loads. The number of consecutive test weighments shall be as described in Table N.4.2.

Table N.4.2. Number of Sample Weights per Test for Automatic Checkweighers

Weighing Range **m = mass of test load**	**Number of sample weights per test**
20 divisions < m < 10 kg 20 divisions < m < 22 lb	60
10 kg <m < 25 kg 22 lb <m < 55 lb	32
25 kg <m < 100 kg 55 lb <m < 220 lb	20
100 kg (220 lb) < m	10

50.3~~2~~. Out-of-Level Tests for Weigh-labelers and Checkweighers (If Applicable)

If the scale is not equipped with a level-indicating means, it must be tested in an out-of-level condition to determine compliance with paragraph S.4. Leveling-Indicating Means.

50.3~~2~~.1. Place one side of the scale three degrees (or 5 %) out-of-level with respect to the width axis of the scale. The scale should then be zeroed. Conduct a shift test[1] and increasing and decreasing load tests.

50.3~~2~~.2. Place the opposite side or the scale out-of-level, zero the scale, and repeat tests.

50.3~~2~~.3. Place the front of the scale three degrees (or 5 %) out-of-level with respect to the length axis of the scale. Zero the scale and conduct the shift, increasing and decreasing load tests.

50.3~~2~~.4. Place back of scale out-of-level, zero the scale, and repeat tests. All test results must be within acceptance tolerances. If the scale fails any of these tests, a level-indicating means is needed.

[1] The shift test is usually conducted first since this test frequently reveals accuracy problems.

Agenda Item 3

PROPOSED CHANGES TO PUB 14 TO INCLUDE COUNTING FEATURE
Page DES 17
UNDERLINED TEXT IS PROPOSED TO BE ADDED

Marking Nominal Capacity, Value of the Scale Division, Special Applications
Code References: S.6., S.6.6. Table S.6.3.a., and Table S.6.3.b.

This requirement applies to digital indicating elements and to both the operator and customer's indications on complete scales. The lettering must be permanent as described in section 1, but the attachment of any badge or decal is slightly less stringent than for the G-S.1. Information. In terms of attachment, any badge or decal must be "durable", that is, it must be difficult to remove (at all temperatures). Remote weight displays (except "scoreboard" displays), the customer's weight display provided for scales interfaced with electronic cash registers (ECRs), and weight displays that are built into ECRs must be marked with the scale capacity and scale division. The capacity by division statement may be part of the scale display or marked adjacent to the display. Large remote customer's ("scoreboard") displays have not been required to meet the marking requirements because the markings probably cannot be read from a customer's position. In those cases, the operator's weight display must be properly marked.

The marked nominal capacity on all vehicle, axle-load, and livestock scales shall not exceed the concentrated load capacity times the quantity of the number of sections in the scale minus 0.5. As a formula, this is stated as:

Nominal Capacity = Concentrated Load Capacity x (N - 0.5)
where N = the number of sections in the scale.

Devices designed for special applications are to be so marked to prevent them from being used in an unsuitable application. Examples of special application scales are prepackaging scales, digital postal scales with simultaneous pound and ounce weight unit indications, weight classifying scales, and Class III scales with a small number of scale divisions and a verification scale division. When a scale is installed with an operational counting feature, the scale shall be marked on both the operator and customer side with the statement, "The counting feature is not legal for trade." Exception: When a prescription scale complies with paragraphs S.1.2.3., S.2.5.3., and S.6.6., it shall be marked, "Counting Feature for Prescription Filling Only."

The system must be clearly and permanently marked on an exterior surface, visible after installation, as follows:

1.1	The name, initials, or trademark of the manufacturer or distributor. A remote display is required to have the manufacturer's name or trademark and model designation. (Code Reference G-S.1.)	Yes ☐ No ☐ N/A ☐
1.2	A model designation that positively identifies the pattern or design of the device. The Model designation shall be prefaced by the word "Model," "Type," or "Pattern." These terms may be followed by the term "Number" or an abbreviation of that word. The abbreviation for the word "Number" shall, as a minimum, begin with the letter "N" (e.g., No or No.) The abbreviation for the word "Model" shall be "Mod" or "Mod." (Effective January 1, 2003) (Code Reference G-S.1.)	**Yes ☐ No ☐ N/A ☐**
1.3	Except for equipment with no moving or electronic component parts, a non-repetitive serial number. (Code Reference G-S.1.)	**Yes ☐ No ☐ N/A ☐**

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1.18.	If a scale has an operational counting feature, it must be marked on both the operator and customer side with the statement, "The counting feature is not legal for trade." Note: Not applicable to prescription scales meeting paragraph 1.19 below.	**Yes ☐ No ☐ N/A ☐**

1.19. If a Class I or Class II prescription scale complies with paragraphs S.1.2.3., S.2.5.3., and S.6.6., it shall be:

1.19.1 marked, "Counting Feature for Prescription Filling Only" (see test procedure in Section 58); **Yes ☐ No ☐ N/A ☐**

1.19.2 marked with the minimum piece weight and minimum number of pieces used to establish an individual piece count. **Yes ☐ No ☐ N/A ☐**

1.~~19~~20 All markings must be clear and easily readable. **Yes ☐ No ☐ N/A ☐**

1.~~20~~21. The lettering for all markings must be permanent. Record the grade for the permanence of markings: _____ **Yes ☐ No ☐ N/A ☐**

1.~~21~~22. If the markings for other than device identification required by G-S.1. are placed on badge or decal, then the badge or decal must be durable (difficult to remove at all temperatures). **Yes ☐ No ☐ N/A ☐**

Proposed New Section to be inserted after Grain Test Scales, Section 38, Page DES 57

38. Counting Feature on Class I or II Scales Used in Prescription Filling Applications
Code References: S.1.2.3, S.2.5.3, N.1.10, T.N.3.10, and Table T.N.3.10

38.1 The scale's accuracy class is Class I or Class II **Yes ☐ No ☐ N/A ☐**
Note accuracy class:

38.2 The counting mode is clearly marked on the display or by an annunciator **Yes ☐ No ☐ N/A ☐**

38.3 The scale display differentiates between count indications and weight indications. **Yes ☐ No ☐ N/A ☐**

38.3.1 If symbol "ct" is used to identify count, it is not used to identify carat in the weighing mode. **Yes ☐ No ☐ N/A ☐**

38.4 Values must be identified with the word or symbol for pieces (pcs) or count (ct) **Yes ☐ No ☐ N/A ☐**

38.5 Count values must be displayed as a whole integer, without a decimal point. **Yes ☐ No ☐ N/A ☐**

38.6 The scale is capable of displaying zero count. **Yes ☐ No ☐ N/A ☐**

Record the marked minimum piece weight (**MPW**): _____

Record the marked minimum sample size in pieces (**MSS**): _____

Calculate and record the minimum sample size in weight (**MSSW**) =MPW x MSS= _____

38.7 The counting feature shall not calculate a piece weight or total count unless the following conditions are met:

38.7.1 Individual piece weight is equal to or greater than 3 e. **Yes ☐ No ☐ N/A ☐**

38.7.2 Sample size is equal to or greater than the marked minimum sample size in pieces. **Yes ☐ No ☐ N/A ☐**

38.8 The marked minimum sample size must be equal to or greater than 10 pieces. Yes ☐ No ☐ N/A ☐

38.9 Place a load of less than **MSSW** on the scale, and enter the **MSS**. The device shall reject the entry. Yes ☐ No ☐ N/A ☐

38.10 Place a load equal to the **MSSW** on the scale and enter a sample count less than the **MSS**. The device shall reject the entry. **Yes** ☐ **No** ☐ **N/A** ☐

In addition to Table 6 Maintenance Tolerances (for weight), the indicated piece count value computed by a Class I or Class II prescription scale counting feature shall comply with the tolerances in Table T.N.3.10. Maintenance and acceptance tolerances are the same.

Table T.N.3.10
Maintenance and Acceptance Tolerances
In Excess and in Deficiency for Count

Indication of Count	Tolerance (piece count)
0 – 100	0
101 to 200	1
201 or more	0.5 %

Notes on testing:

Conduct at least two increasing and decreasing load tests with at least four different test loads, including the maximum at each tolerance level. Do not recalibrate the scale during this test. Document any non-conformance results.

Example:

Scale Capacity = 620g x 0.01 g
(marked with a minimum piece weight of 0.03 g and a minimum piece count of 10)
Piece weight =0.03 g = 3 e
Minimum sample size =10 pieces =30 e = 0.30 g
100 pcs = 300 e = 3 g
200 pcs = 600 e = 6 g

To achieve the highest possible count, divide the capacity (620 g) by the minimum weight of the piece count (0.03 g). Truncate the quotient (20666.666 counts) to the nearest whole integer (20666 counts).

To perform the test at near maximum, pick a whole number near this amount, such as 20500. Calculate the amount of weight that should cause the scale to indicate a count of 20500 by multiplying the desired count (20500) by the weight of the minimum piece weight (0.03 g), The result is 615 g. Place 615 g on the scale and it should indicate 20500 counts.

38.11 Calculate the loads required to cause the scale to indicate, respectively, a count of 10 100, 200, and maximum count capacity (based on scale capacity and minimum individual piece weight). The device indicates each of these loads within the tolerance specified in table T.N.3.10. **Yes** ☐ **No** ☐ **N/A** ☐

(If necessary, check several more loads to verify the count calculation at other loads and minimum sample counts.)

38.7 The counting feature shall not calculate a piece weight unless the following conditions are met:

38.7.1 The individual piece weight is equal to or greater than 3 e. **Yes** ☐ **No** ☐ **N/A** ☐

38.7.2 The sample size is at least 10 pieces or the marked minimum sample size in pieces, whichever is greater. **Yes** ☐ **No** ☐ **N/A** ☐

38.7.3 The sample count indication is stable. **Yes** ☐ **No** ☐ **N/A** ☐

75. List of Acceptable Abbreviations/Symbols

Device Application	Term	Acceptable	Not Acceptable
Livestock & Animal Scales:	Head (sale by)	HB or H	
	Weight (sale by)	WT or W	
	Other symbols recognized by the Packers & Stockyards Administration		
Prescription Filling Count Feature for Class I & II Scales:	Minimum Piece Weight	MPW	
	Minimum Sample Size	MSS	
	Minimum Sample Size in Weight	MSSW	
Belt Conveyor Scales:	U.S. short ton (note: different from "General" application)	T	

Agenda Item 14

Add a check box in the Publication 14 DES checklist that states the computing scale interfaced to an ECR meets the applicable requirements in the ECRS checklist as follows:

27.4 If the computing scale is interfaced with a electronic cash register (ECR), the ECRS checklist must also be completed. The operation of the computing scale with the ECR meets the ECRS checklist. **Yes** ☐ **No** ☐ **N/A** ☐

and

Amend ECRS Sections 11.15 through 11.21 as follows:

11.15. A computing scale may interface with a cash register, and the cash register need only record the total price, that is, serve merely as a printer, provided:

~~11.15.~~	11.15.1.	The computing scale displays the net weight, unit price, and total price on both the operator and customer sides of the scale.	**Yes** ☐ **No** ☐ **N/A** ☐
~~11.16.~~	11.15.2.	The computing scale has a tare capability.	**Yes** ☐ **No** ☐ **N/A** ☐
~~11.17.~~	11.15.3.	The scale is positioned so the customer can accurately read the indications and observe the weighing operation.	**Yes** ☐ **No** ☐ **N/A** ☐
~~11.18.~~	11.15.4.	The scale must be equipped with motion detection that complies with Handbook 44 requirement S.2.4.1.	**Yes** ☐ **No** ☐ **N/A** ☐
~~11.19.~~	11.15.5.	The scale is not equipped with a price-look-up capability. The unit price must be manually entered into the computing scale to give the customer adequate time (equivalent to a transaction in the delicatessen department) to assimilate the display information.	**Yes** ☐ **No** ☐ **N/A** ☐
~~11.20.~~	11.15.6.	The electronic cash register must not have any input to the computing scale in the process of determining the total price of a weighed item.	**Yes** ☐ **No** ☐ **N/A** ☐
~~11.21.~~	11.15.7.	If the ECR is equipped with a computing scale, it shall meet the criteria given above.	**Yes** ☐ **No** ☐ **N/A** ☐
	11.15.8.	If the scale has multiple sales accumulation capability, the scale accumulation capability is disabled.	**Yes** ☐ **No** ☐ **N/A** ☐

11.15.9. If the ECR is equipped with a computing scale, it shall meet the criteria given above. **Yes ☐ No ☐ N/A ☐**

Agenda Item 15

27. Computing Scales – General ~~Without Multiple Sales Accumulation Capability~~

Code Reference: S.1.8.3, G-S.2, G-S.5.1, G-S.6, S.1.9.2

27.1 The net weight, unit price, and total price are clearly displayed and identified on both the operator and customer sides of the scale. **Yes ☐ No ☐ N/A ☐**

27.1.1 The unit price is clearly defined. **Yes ☐ No ☐ N/A ☐**

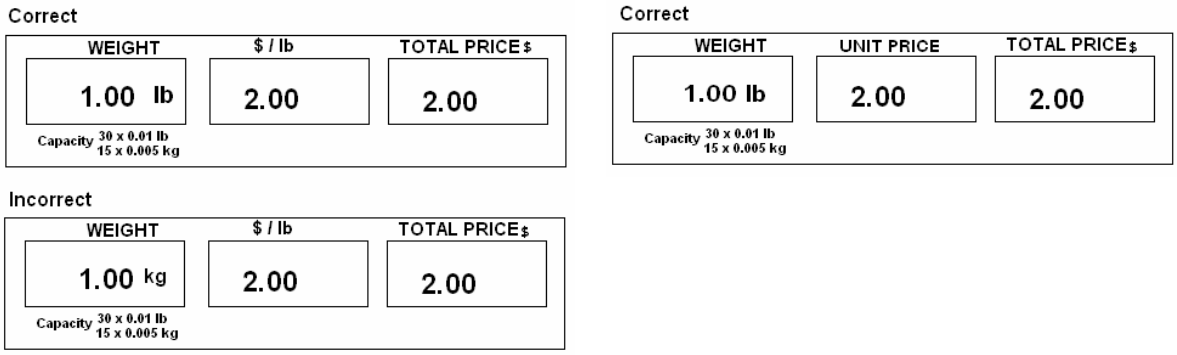
The symbols "$/" with a unit symbol (i.e., lb, kg, g) may be used, provided:

27.1.1.1 -the scale is capable of only displaying net weight in that weight unit, or **Yes ☐ No ☐ N/A ☐**

27.1.1.2 -the scale has an internal units selection switch that can be sealed in the unit used for both the unit price and the net weight display, or **Yes ☐ No ☐ N/A ☐**

27.1.1.3 -the scale has an external unit conversion key, and the unit of mass marked in the unit price display and the unit of mass marked in the weight display are the same. **Yes ☐ No ☐ N/A ☐**

Examples of scale display



27.2 The computing scale has tare capability. **Yes ☐ No ☐ N/A ☐**

27.3 Computing Scales with Printers

In the case of printers that issue labels for packages, requirements of the Fair Packaging and Labeling Act and the Uniform Packaging and Labeling Regulation apply.

Preprinted labels stating the unit of measure (i.e., lb, kg) acceptable for scales capable of displaying one weight unit or which have an internal lb/kg conversion switch.

27.3.1 The unit price is clearly defined. **Yes ☐ No ☐ N/A ☐**

The symbols "$/" with a unit symbol (i.e., lb, kg, g) may be used, provided:

27.3.1.1 -the scale is only capable of printing the net weight in that weight unit, or **Yes ☐ No ☐ N/A ☐**

27.3.1.2 -the scale has an internal units selection switch that can be sealed in the unit used for both the unit price and the net weight, or **Yes ☐ No ☐ N/A ☐**

27.3.1.3 -the scale has an external unit conversion key, and the unit of mass printed in the unit price and the unit of mass printed with the weight are the same. **Yes ☐ No ☐ N/A ☐**

27.3.2 The symbol "$" or the word "dollars" is printed with the total price and must be printed by the device or pre-printed on the label. **Yes ☐ No ☐ N/A ☐**

27.3.3 The quantity block must be headed with the words "Net Weight/Count". (The term "Net Weight" is optional.) If the printer does not print the specific weight unit, the pre-printed label must include this information; for example, pound, lb, or kg. **Yes ☐ No ☐ N/A ☐**

27.3.4 For items sold by count, the count is printed in the quantity block. **Yes ☐ No ☐ N/A ☐**
NOTE: If there are no individual blocks for the printed information, and the printer prints a qualifying term such as "pieces" or a symbol such as "pcs" in a horizontal manner reading from left to right, and if there is little doubt as to the meaning of the label, then it is considered appropriate.

27.3.5 The count must be printed as an integer without a decimal point and must be modified with the word or symbol for pieces (pcs) or count (ct) either in the heading or next to the number. **Yes ☐ No ☐ N/A ☐**

27.3.6 Printing of non-weighed items by count shall either *(27.1 in 2004 edition)*

27.3.6.1 operate only under no load condition or *(27.1.1 in 2004 edition)* **Yes ☐ No ☐ N/A ☐**

27.3.6.2 cause the display to blank. *(27.1.2 in 2004 edition)* **Yes ☐ No ☐ N/A ☐**

Incorrect Label		
Net Weight	Unit Price	Total Price
1.00 kg	$2.00	**$2.00**

(unit price not identified with unit)

Correct Label		
Net Weight	Price	Total Price
1.00 kg	$2.00/kg	**$2.00**

Incorrect Label		
Net Weight	Unit Price	Total Price
1.00 lb	$2.00	**$2.00**

(unit price not identified with unit)

Correct Label		
Net Weight	Unit Price	Total Price
1.00 lb	$2.00/lb	**$2.00**

Incorrect Label		
Net Weight	Price/lb	Total Price
1.00 kg	$2.00	**$2.00**

(different units of net weight and unit price)

Correct Label		
Net Weight/CT	Unit Price	**Total Price**
10	$2.00	**$20.00**

Correct Label		
Net Weight	$/lb	**Total Price**
1.00 lb	$2.00	**$2.00**

27.4 If the computing scale is interfaced with a electronic cash register (ECR), the ECRS checklist must also be completed. The operation of the scale with the ECR meets the ECRS checklist. *(from previous agenda item)* **Yes ☐ No ☐ N/A ☐**

Agenda Item 19

The Sector recommends that following amendments to Publication 14 DES Section 18 indicated in underlined text be included in Publication 14.

18. Zero Indication - General

Code Reference: G.S.5.1., G.S.1, S.6.3

Any of the following methods may be used to indicate a negative balance condition.

18.1. Display of negative values. **Yes** ☐ **No** ☐ **N/A** ☐

A display of negative weight values is required in the net display mode when the gross weight is less than the tare value. This assumes that the gross weight is zero or positive. If the gross weight is negative (behind zero-balance condition), and if blanking the display is used to indicate a behind-zero-balance condition, the gross and net display may blank.

18.2. Blanking the display **Yes** ☐ **No** ☐ **N/A** ☐

This method cannot be used to indicate a negative balance condition if the device also: (1) blanks the display to indicate over-capacity and (2) the load condition of the weighing/load receiving element is not evident to the operator, (e.g., a hopper scale where the operator cannot see the load condition, empty or full, of the hopper).

If blanking is used, it is recommended that the indicator also have an annunciator to indicate "power on" so the operator does not think that power has been lost when the display is blank.

18.2.1 When blanking a primary weight display with live on screen G-S.1 and/or S.6.3 markings, the required markings must **not** blank. **Yes** ☐ **No** ☐ **N/A** ☐

18.3. Display of a symbol which cannot be interpreted as a quantity value, (e.g., -, ---, EEEE, E S-1) is acceptable; however, the display of complements are not acceptable, and flashing zeros or a minus sign preceding a zero or zeros cannot be used. **Yes** ☐ **No** ☐ **N/A** ☐

The Sector recommends that following amendments to Publication 14 ECRS Section 5 indicated in underlined text be included in Publication 14. Language to be removed is indicated in ~~strikeout~~ text.

5. Identification

Code Reference: G.S.5.1., G.S.1, S.6.3

……. No changes in this area
……. No changes in this area
……. No changes in this area

5.1. The cash register shall be clearly and permanently marked for the purposes of identification with the following information:

5.1.1. The name, initials, or trademark of the manufacturer or distributor. **Yes** ☐ **No** ☐ **N/A** ☐

5.1.2. A model designation that positively identifies the pattern or design of the device. The Model designation shall be prefaced by the word "Model", "Type", or "Pattern". These terms may be followed by the term "Number" or an abbreviation of that word. The abbreviation for the word "Number" shall, as a minimum, begin with the letter "N" (e.g., No or No.) The abbreviation for the word "Model" shall be "Mod" or "Mod.". (Effective January 1, 2003). **Yes** ☐ **No** ☐ **N/A** ☐

5.1.3. Except for equipment with no moving or electronic component parts and not-built-for-purpose, software-based devices, a nonrepetitive serial number. **Yes** ☐ **No** ☐ **N/A** ☐

5.1.4. For not-built-for-purpose, software-based devices, the current software version designation. **Yes** ☐ **No** ☐ **N/A** ☐

5.1.5. The serial number shall be prefaced by the words "Serial Number" or an abbreviation of that term. Abbreviations for the word "Serial" shall, as a minimum, begin with the letter "S," and abbreviations for the word "Number" shall, as a minimum, begin with the letter "N" (e.g., S/N, SN, Ser. No, and S No.). **Yes** ☐ **No** ☐ **N/A** ☐

Location of the information: _____

~~**Code Reference G-S.1. (g). Effective January 1, 2003**~~

5.1.6. The NTEP Certificate of Conformance (CC) Number or a corresponding CC addendum number for devices that have a CC. The number shall be prefaced by the terms "NTEP CC", "CC", or "Approval." These terms may be followed by the word "Number" or an abbreviation for the word "Number." The abbreviation shall, as a minimum, begin with the letter "N" (e.g., No or No.). **Yes** ☐ **No** ☐ **N/A** ☐

The device must have an area, either on the identification plate or on the device itself, suitable for the application of the Certificate of Conformance Number. If the area for the CC Number is not part of an identification plate, note its intended location and how it will be applied. **Yes** ☐ **No** ☐ **N/A** ☐

Location of CC Number if not located with the identification

_____

_____

5.2. The other components of the system are marked consistent with the above description. **Yes** ☐ **No** ☐ **N/A** ☐

5.3. Identifying information shall be:

5.3.1. Located so that it is readily observable without the necessity of disassembling a part requiring the use of any means separate from the device. If the required information is located on the back of a device, the same information must also appear on the side, front, or top. The bottom of a device is not an acceptable surface. If required markings are behind a door or panel, the manufacturer is encouraged to put a label on the outside of the device that explains where the identification information is located **Yes** ☐ **No** ☐ **N/A** ☐

5.3.2. Marked on a surface that is an integral part of the chassis. **Yes** ☐ **No** ☐ **N/A** ☐

5.4. If the required marking is on a plate or badge, the plate must be permanent. (See criteria above for Permanence of Attachment of Badge.) **Yes** ☐ **No** ☐ **N/A** ☐

5.5. The lettering for all markings must be permanent. **Yes** ☐ **No** ☐ **N/A** ☐

Record the grade for the markings: _____

~~**Code Reference: G-S.1.1. Location of Marking Information for Not Built-for-Purpose, Software-Based Devices. Effective January 1, 2004**~~

5.6 When blanking a primary weight display, with live on screen G-S.1 and/or S.6.3 markings, the required markings must **not** blank. **Yes** ☐ **No** ☐ **N/A** ☐

5.~~6.~~7 For not-built-for-purpose, software-based devices, the following shall apply:

5.7.1 The manufacturer or distributor and the model designation shall be continuously displayed or marked on the device; or **Yes** ☐ **No** ☐ **N/A** ☐

~~5.7.~~ 5.7.2 The Certificate of Conformance (CC) Number shall be continuously displayed or marked on the device, or **Yes** ☐ **No** ☐ **N/A** ☐

~~5.8.~~ 5.7.3 All required information in G-S.1. Identification. (a), (b), (c), (e), and (h) shall be continuously displayed. Alternatively, a clearly identified "view only" System Identification, G-S.1. Identification, or Weights and Measures identification shall be accessible through the "Help" menu. Required information includes that information necessary to identify that the software in the device is the same type that was evaluated. **Yes** ☐ **No** ☐ **N/A** ☐

~~5.9.~~ 5.7.4 Clear instructions for accessing the remaining required G-S.1. information shall be listed on the CC. Required information includes that information necessary to identify the software in the device is the same type that was evaluated. **Yes** ☐ **No** ☐ **N/A** ☐

Agenda Item 21

X. **Cash Acceptors or Card-activated Systems**
Code Reference: G-S.2., G-S.5.1., G-S.6
Accidental or intentional fraud causes great concern when customers use cash acceptors or card-activated systems.

Because systems may be installed with separate power lines to the controller, card reader, and scale, tests should be run with power failures to different parts of the system to evaluate the potential for accidental or intentional errors. The appropriate device response depends upon when the power loss occurs during the transaction.

Tests using various denominations of bills accepted by the cash acceptor should be performed.

Certificates of Conformance will cover the use of the cash acceptor option at both attended and unattended systems. Cash acceptors, which are used at unattended locations, must meet the marking requirements of paragraph G-UR.3.4. Responsibility, Money-Operated Devices shall be clearly and conspicuously displayed on the device or immediately adjacent to the device information detailing the return of monies paid when the product cannot be obtained.

Note: For bills that have not yet been drawn into the cash acceptor to the point that the bill is no longer visible, it is assumed that the information on the bill denomination can be obtained from visual examination.

Various methods may be used to recall specific portions of the transaction depending on how the basic system operates. For example, systems that can print a record of the amount fed into the machine as each bill is fed into the device maintain an ongoing record of bills recognized by the system. Other systems may not print a receipt until the end of the transaction, so the information is recalled on a journal printer accessible to the customer or can be recalled on the cash acceptor display

1.1 Systems with Battery Back-up or Uninterruptible Power Supply or Equivalent - Some systems are equipped with a battery back-up or an uninterruptible power supply (or equivalent) which allows a transaction to continue in the event of a power loss. For such systems, the transaction in progress at the time of a power interruption must continue as if no power interruption had occurred (or comply with the requirements for systems not equipped with a battery back-up). That is, all bills (including bills being fed into the device at the time of the power loss) must be correctly accounted for, and the total sale amount must be mathematically correct. Check these systems by interrupting power at several points in the transaction to ensure that all information (total price, mathematical agreement, and total dollar amount inserted by the customer) is accounted for correctly. **Yes** ☐ **No** ☐ **N/A** ☐

1.2. All Other Systems - To check the operation of systems not equipped with a battery back-up, uninterruptible power supply, or equivalent, interrupt power as described below. As noted earlier, if separate power lines supply different components in the system, interrupt power to different parts of the system. **Yes** ☐ **No** ☐ **N/A** ☐

When one or more bills have been accepted and registered by the device, at least one of the following criteria must be met to ensure that this information can be recalled in the event of a power interruption:

1.2.1. The printer on the device must print the denomination of the bill as the device recognizes the bill. (The printed receipt must be available to the customer.) **Yes** ☐ **No** ☐ **N/A** ☐

1.2.2. A journal or other printer accessible to the customer must print the denomination of each bill as the device recognizes each bill. **Yes** ☐ **No** ☐ **N/A** ☐

1.2.3. The total display must be capable of being recalled for at least 15 minutes. **Yes** ☐ **No** ☐ **N/A** ☐

1.2.4. Means are provided to enable the customer to retrieve the money inserted into the device (e.g., a button which can be used during a power interruption to eject the money inserted by the customer). **Yes** ☐ **No** ☐ **N/A** ☐

1.2.5. Other means is used to provide a visual or printed record of the total amount of money accepted by the device. **Yes** ☐ **No** ☐ **N/A** ☐

1.3. There is a brief period of time during which a bill has been accepted by the cash acceptor but has not yet been recognized by the device. The following criteria must be met to ensure completion of that this information can be recalled in the event of a power failure. **Yes** ☐ **No** ☐ **N/A** ☐

1.3.1. Means is provided to enable the attendant or customer to retrieve the bill (for example, a button which can be used during a power interruption to eject the bill or if the cash acceptor box can be removed by the attendant and the bill retrieved). **Yes** ☐ **No** ☐ **N/A** ☐

Note: There may be a space of time in which a bill can be caught partially in and out of the cash acceptor during a power interruption. In such a case, if the denomination of the bill is visible to the customer and attendant, this is sufficient to provide information about the bill being fed into the device at the time of the power interruption. The cash acceptor must comply with the other applicable items noted above.

1.4. Power should be interrupted at different points in the transaction to determine that all transaction information can be recalled in the event of a power interruption including combinations of the following:

1.4.1. after one bill has been inserted. **Yes** ☐ **No** ☐ **N/A** ☐

1.4.2. after several bills have been inserted. **Yes** ☐ **No** ☐ **N/A** ☐

1.4.3. while a bill is being inserted. **Yes** ☐ **No** ☐ **N/A** ☐

1.4.4. after a bill has been inserted but not yet recognized. **Yes** ☐ **No** ☐ **N/A** ☐

1.4.5. after a bill(s) has been inserted and recognized. **Yes** ☐ **No** ☐ **N/A** ☐

1.5. Total Money Display - A running display showing the amount of money fed into the machine must be provided. **Yes** ☐ **No** ☐ **N/A** ☐

1.6. Printed Receipt - A printed receipt must be available to the customer from the device at the completion of the transaction. **Yes** ☐ **No** ☐ **N/A** ☐

Because the customer must be provided with a receipt, the system must not accept cash if sufficient paper is not available to complete the transaction.

The cash acceptor must not initiate a cash transaction if either of the following conditions are true:

- no paper is in the receipt printer of the cash acceptor; **Yes** ☐ **No** ☐ **N/A** ☐
- insufficient paper is available to complete a transaction. **Yes** ☐ **No** ☐ **N/A** ☐

1.7. Instructions must be marked on the device to inform the customer how to operate the cash acceptor. **Yes** ☐ **No** ☐ **N/A** ☐

1.8. Means must be provided for the customer to cancel the transaction at any point. **Yes** ☐ **No** ☐ **N/A** ☐

1.8.1. The customer has inserted cash. If the customer cancels the transaction by pressing the cancel key (or equivalent key(s)), the device must either: **Yes** ☐ **No** ☐ **N/A** ☐

1.8.1.1. be equipped with means for the customer to retrieve the cash inserted from the device, AND **Yes** ☐ **No** ☐ **N/A** ☐

automatically issue a printed receipt indicating the amount tendered and the amount returned, OR

1.8.1.2. display instructions (such as "sale terminated, see attendant," "sale terminated, get receipt" or similar wording) for the customer to see the attendant, AND **Yes** ☐ **No** ☐ **N/A** ☐

automatically issue a printed receipt showing the amount of cash inserted by the customer, a statement indicating that the sale was terminated, and instructions for the customer to see the attendant. **Yes** ☐ **No** ☐ **N/A** ☐

Note: It is acceptable for different messages to be used. This depends upon whether the transaction is terminated by use of the cancel key (e.g., "sale terminated, get receipt" or "sale terminated, see cashier", "change due, see cashier").

Appendix B – NTETC Weighing Sector Attendance List

First Name	Last Name	Organization	E-Mail
Cary	Ainsworth	c/o USDA GIPSA	L.Cary.Ainsworth@usda.gov
Joseph	Antkowiak	Flintec, Inc.	jantkowiak@flintec-us.com
William E.	Bates	USDA ,GIPSA , FMD, PPB	william.e.bates@usda.gov
Andrea P.	Buie	Maryland Dept. of Agriculture	buieap@mda.state.md.us
Luciano	Burtini	Measurement Canada	burtini.luciano@ic.gc.ca
Ken	Chin	Measurement Canada	chin.ken@ic.gc.ca
Brian	Christopher	McKesson Automated Prescription Systems	brian.christopher@mckessonaps.com
Steven E.	Cook	NIST, Weights & Measures Division	steven.cook@nist.gov
Scott	Davidson	Mettler-Toledo, Inc.	scott.davidson@mt.com
Terry	Davis	Kansas Dept. of Agriculture	tdavis@kda.state.ks.us
William	Fishman	New York Bureau of Weights & Measures	bill.fishman@agmkt.state.ny.us
Darrell E.	Flocken	Mettler-Toledo, Inc.	darrell.flocken@mt.com
Gary	Lameris	Hobart Corporation	gary.lameris@hobartcorp.com
Stephen	Langford	Cardinal Scale Manufacturing Co.	slangford@cardet.com
Jean	Lemay	Measurement Canada	lemay.jean@ic.gc.ca
Paul A.	Lewis, Sr.	Rice Lake Weighing Systems	paulew@rlws.com
Todd R.	Lucas	Ohio Dept. of Agriculture	lucas@mail.agri.state.oh.us
L. Edward	Luthy	Brechbuhler Scales Inc	eluthy@brechbuhler.com
Michel	Maranda	Measurement Canada	maranda.michel@ic.gc.ca
Don	Onwiler	Nebraska Division of Weights & Measures	donlo@agr.state.ne.us
Stephen	Patoray	National Conference on Weights & Measures	spatoray@mgmtsol.com
Ron	Peasley	Measurement Canada	
David W.	Quinn	Fairbanks Scales	dave.w.quinn@mindspring.com
Frank	Rusk	Coti, Inc.	frankjrusk50@hotmail.com
Milton	Smith	Measurement Canada	smith.milton@ic.gc.ca
Russ	Wyckoff	Oregon Dept. of Agriculture	rwyckoff@oda.state.or.us
Jesus P.	Zapien	A&D Engineering Inc	jzapien@andweighing.com